SEVBO, P.I.

Determining the level of mechanization and automation in welding. Avtom. svar. 18 no.3:62-67 Mr '65.
(MIRA 18:6)

1. Institut elektrosvarki im. Ye.O. Patona AN UkrSSR.

SEVBO, V.I. (Uzhgorod)

Studying inequalities in the 10th class. Mat. v shkole no.5: 39-42 S-O '54. (MLRA 7:11)
(Inequalities (Mathematics))

SEVC, Josef

Phosphine and arsine hazards during the processing of ferrosilicon. Pracovni. lek. 12 no.3:158-160 Ap '60.

1. Krajska hygienicko-epidemiologicka stanice v Hradci Kralove, reditel MUDr. L. Slezacek; Oddeleni chorob z povolani KUNZ, prednosta MUDr. J. Jindrichova.
(ARSENICALS toxicol.)
(PHOSPHORUS toxicol.)
(IRON)
(SILICON)

ŠEVC, Josef; HARAŠEK, Rudolf

Contribution to the combined effect of SiO2 and alpha irradiation in experiments on animals. Prac. lek. 16 no.6:268-272 Ag '64.

1. Ustav pro hygienu prace a prevenci chorob z povolani v Jachymove, (reditel - dr. J. Sevc).

SAMEK, Jaroslav; SEVCEK, Jozef

Contribution to the evaluation of water resistance of urea glues. Drevarsky vyskum no.2:117-126'62.

1. Statny drevarsky vyskumny ustav, Bratislava.

SEVC, Josef; MOSIL, Karel

Natural radioactivity in Czechoslovakian coal and metal ore mines.
Prac. lek. 16 no.7:312-314 S '64.

1. Ustav pro hygienu prace a prevenci chorob z povolani, Jachymov (reditel dr. J. Sevc).

UDC 613.641:614.715-073.602

CZECHOSLOVAKIA

SEVC, Josef; CECH, Jan; Institute of Work Hygiene of the Uranium Industry (Ustav Hygieny Prace v Uranovem Prumyslu), Pribram, Director (Reditel) Dr J. SEVC.

"Concentration of Rn^{222} and its Fission Products in Some Czechoslovak Mines."

Prague, Pracovni Lekarstvi, Vol 18, No 10, Dec 66, pp 438-442

Abstract [Authors' English summary modified]: Radiodosimetric investigation was carried out in 22 coal and in 12 ore mines in the period 1962 - 1965. The concentration of Rn^{222} and its short-life fission products was investigated; the level of external gamma-radiation was determined. In 11 mines in 15-100% of the locations the Rn concentrations exceeded 30.0 pCi/l; in 8 mines in 50% of locations the Rn concentrations exceeded 100 pCi/l. In other mines these concentrations were very low. Precautions to be taken in the mines with high concentrations of Rn are discussed. 1 Figure, 4 Tables, 5 Western, 2 Czech, 2 Russian references. (Manuscript received 27 Nov 65).

1/1

SEVCHNCO, V.

A species of Leptosphaeria, a parasite on the alga Lemanea fluviatilis (Dillw.) Ag. in Rumania. p. 103

STUDII SI CERCETARI DE BIOLOGIE. SERIA BIOLOGIE VEGETALA. Bucuresti, Rumania. Vol. 11, no. 2, 1959.

Monthly list of East European Accessions (EEAI) LC, Vol. 9, no. 2, August 1959.

Uncl.

SEVCENCO, Victoria; RAICU, Cristina

Some new micromycetes in Rumania. Comunicare AR 11 no.6:689-694 Je '61.

1. Comunicare prezentata de Alice Savulescu, membru corespondent al Academiei R.P.R.

DAVIDESCO, Victoria
SURNAME (in caps); Given Names

Country: Rumania

Academic Degrees: -not given-

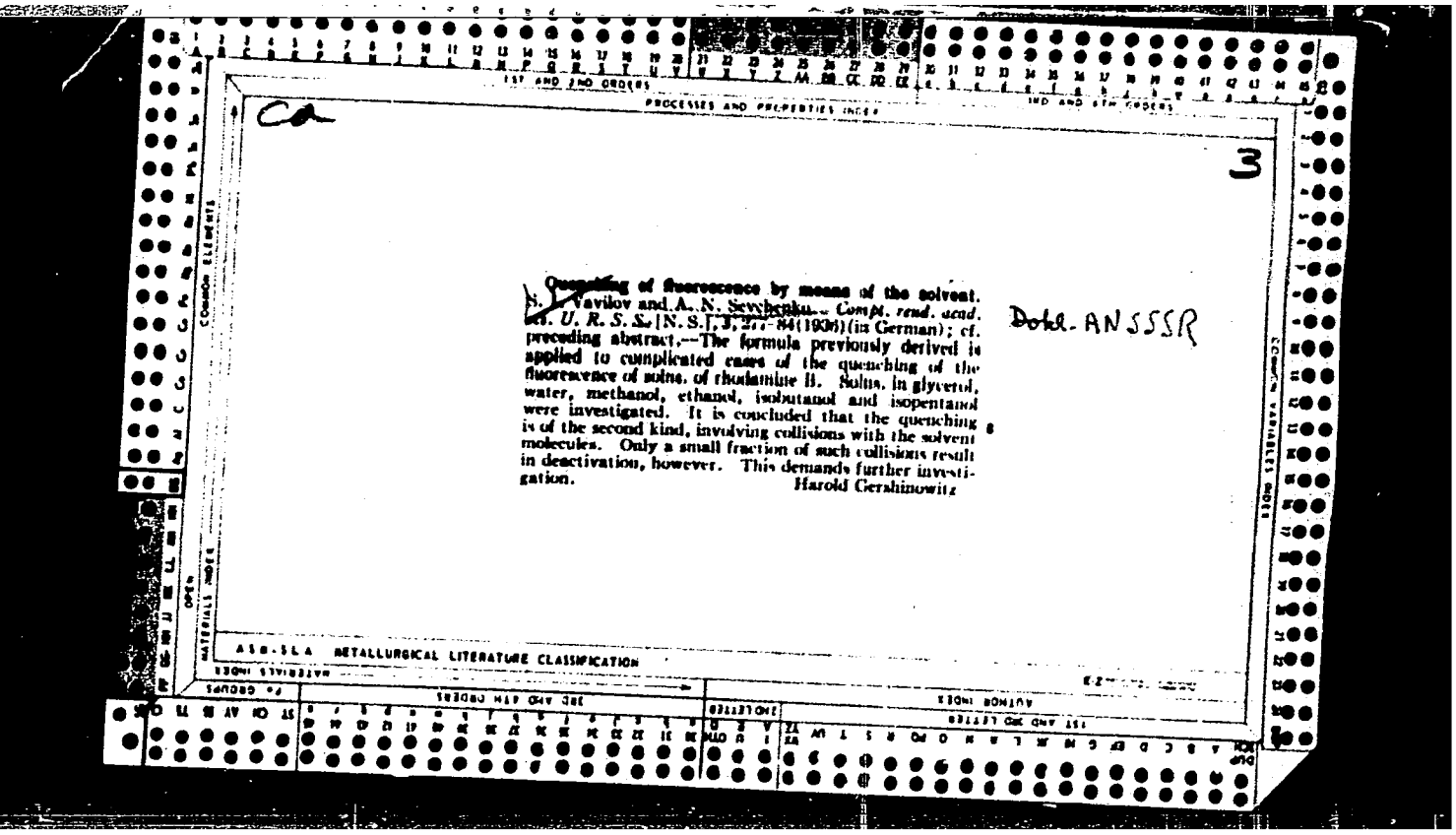
Affiliation: -not given-

Source: Bucharest, Comunicarile Academiei Republicii Populare Romine, Vol 11, No 6, 1961, pp 689-694.

Data: " Some Miromycetes That Are New For the Rumanian People's Republic."

SEVCENKO, V.B. [Shevchenko, V.B.]; ZOLOTUCHA, S.I. [Zolotukha, S.I.]; KASCEJEV, N.F. [Kashcheyev, N.F.]; CAREV, S.A. [TSarev, S.A.]; MICHAJLOV, A.A. [Mikhaylov, V.A.]; TOROPCENOVA, G.A. [Toropchenova, G,A,]; MANCIK, M. [translator]

Complex utilization of uranium ores. Jaderna energie 4 no.11: 338-341 N '58.



Quenching of fluorescence by means of the solvent. S. I. Vavilov and A. N. Sevchenko. *Compt. rend. acad. sci. U. R. S. S.* [N. S.] 3, 211-14 (1936) (in German); cf. preceding abstract.—The formula previously derived is applied to complicated cases of the quenching of the fluorescence of solns. of rhodamine B. Solns. in glycerol, water, methanol, ethanol, isobutanol and isopentanol were investigated. It is concluded that the quenching is of the second kind, involving collisions with the solvent molecules. Only a small fraction of such collisions result in deactivation, however. This demands further investigation.

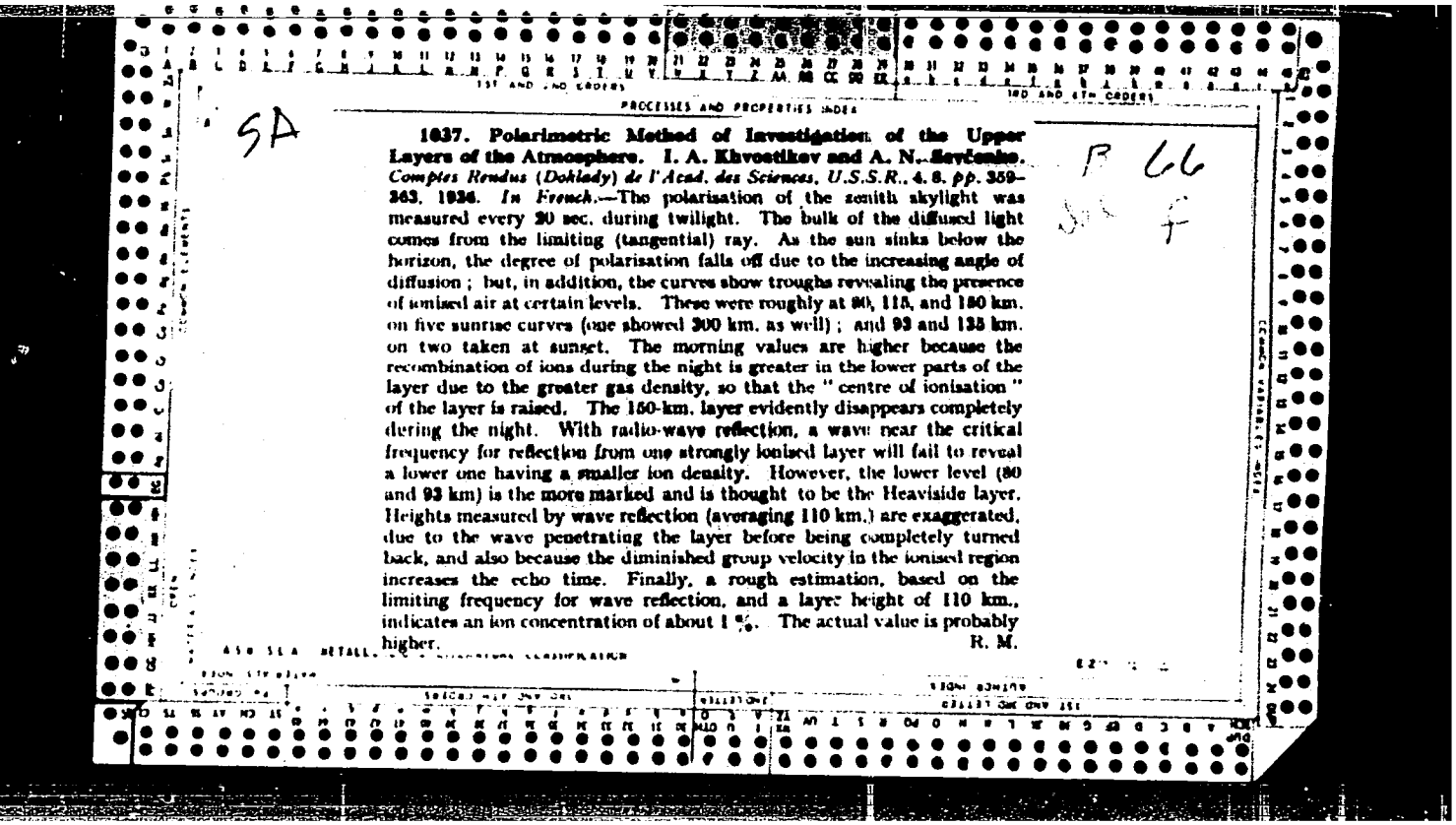
Harold Gershinowitz

Dokl. AN SSSR

3

Ca

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



PROCESSES AND PROPERTIES INDEX

1037. Polarimetric Method of Investigation of the Upper Layers of the Atmosphere. I. A. Khvostikov and A. N. Savčenko. *Comptes Rendus (Doklady) de l'Acad. des Sciences, U.S.S.R.*, 4. 8. *pp.* 359–363. 1936. *In French.*—The polarisation of the zenith skylight was measured every 20 sec. during twilight. The bulk of the diffused light comes from the limiting (tangential) ray. As the sun sinks below the horizon, the degree of polarisation falls off due to the increasing angle of diffusion; but, in addition, the curves show troughs revealing the presence of ionised air at certain levels. These were roughly at 80, 115, and 180 km. on five sunrise curves (one showed 300 km. as well); and 93 and 138 km. on two taken at sunset. The morning values are higher because the recombination of ions during the night is greater in the lower parts of the layer due to the greater gas density, so that the "centre of ionisation" of the layer is raised. The 180-km. layer evidently disappears completely during the night. With radio-wave reflection, a wave near the critical frequency for reflection from one strongly ionised layer will fail to reveal a lower one having a smaller ion density. However, the lower level (80 and 93 km) is the more marked and is thought to be the Heaviside layer. Heights measured by wave reflection (averaging 110 km.) are exaggerated, due to the wave penetrating the layer before being completely turned back, and also because the diminished group velocity in the ionised region increases the echo time. Finally, a rough estimation, based on the limiting frequency for wave reflection, and a layer height of 110 km., indicates an ion concentration of about 1 %. The actual value is probably higher. R. M.

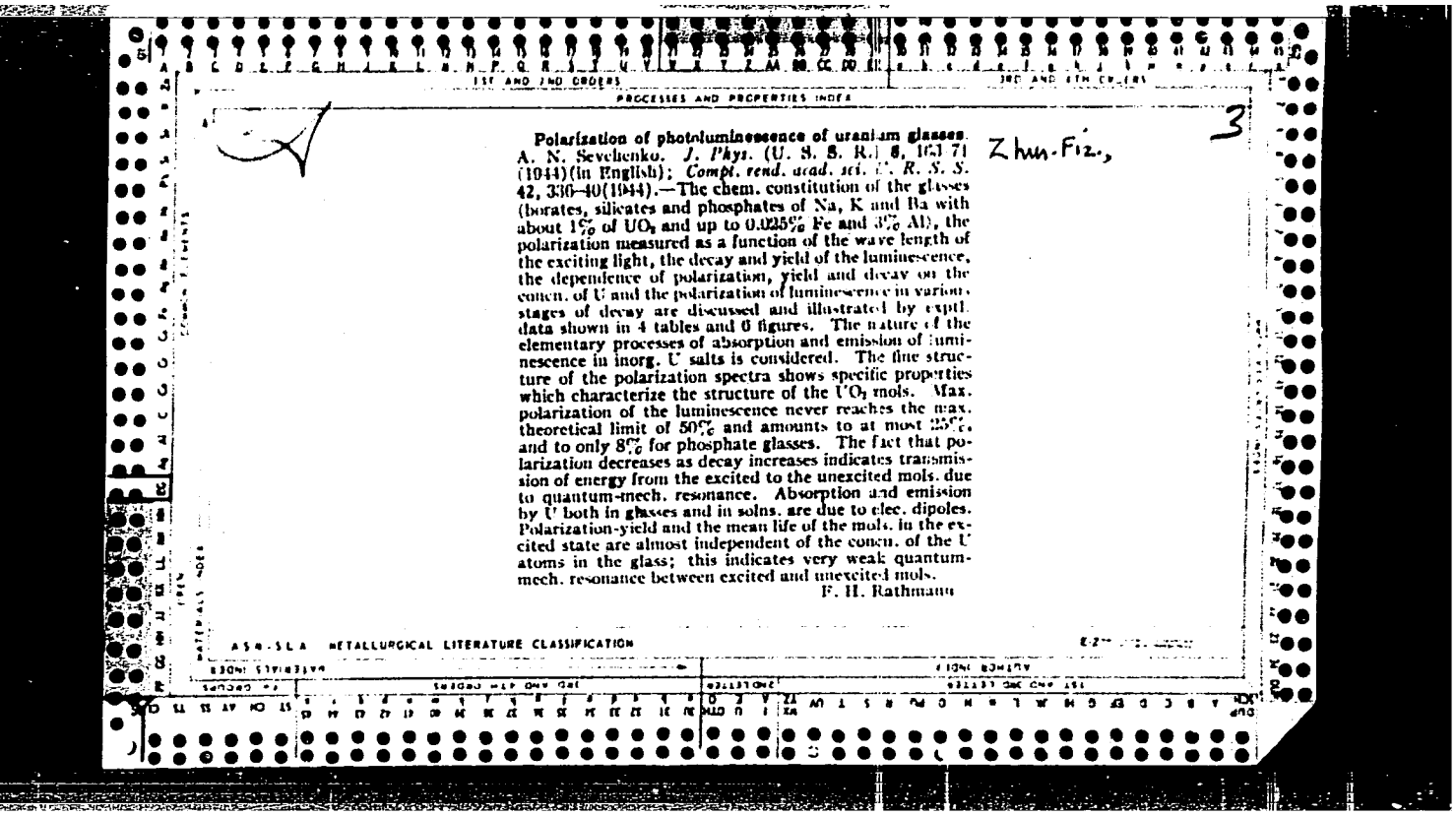
CA

3

Decay of luminescence in rare earth solutions. S. I. Vavilov and A. N. Sevchenko. *Compt. rend. acad. sci. U. R. S. S.* **27**, 841-6(1940)(in English).--The fluorescence of solns. of salts of Tb, Eu and Sm in various solvents (H_2O, alc., sugar sirup, glass) was found to be unpolarized, no matter what the η of the soln. might be. The efficiency of the luminescence of Sm in liquid solns. was unaffected by concn., temp., or the presence of various foreign substances, but was much greater in glass, though the spectrum was the same for glass and liquid. Measurements with a Becquerel phosphoroscope showed that in Sm glass 2 decay processes, of short and long duration, coexist, the values of τ (reciprocal of the decay const.) being $<10^{-4}$ sec. and 4.04×10^{-3} sec. Both processes yield light of the same spectrum. In liquid Sm solns., only the short-duration process is found. In aq. solns. of Tb and Eu, however, only the long-lived type occurs ($\tau = 5.0 \times 10^{-4}$ and 8.2×10^{-4} sec., resp.).

A. O. Allen

A.S.M. METALLURGICAL LITERATURE CLASSIFICATION



PROCESSES AND PROPERTIES INDEX

Polarization of photoluminescence of uranium glasses. A. N. Sevchenko. *J. Phys.* (U. S. S. R.) 8, 163-71 (1944)(in English); *Compt. rend. acad. sci. U. R. S. S.* 42, 336-40(1944).—The chem. constitution of the glasses (borates, silicates and phosphates of Na, K and Ba with about 1% of UO_3 and up to 0.025% Fe and 3% Al), the polarization measured as a function of the wave length of the exciting light, the decay and yield of the luminescence, the dependence of polarization, yield and decay on the concn. of U and the polarization of luminescence in various stages of decay are discussed and illustrated by exptl. data shown in 4 tables and 6 figures. The nature of the elementary processes of absorption and emission of luminescence in inorg. U salts is considered. The fine structure of the polarization spectra shows specific properties which characterize the structure of the UO_2 mols. Max. polarization of the luminescence never reaches the max. theoretical limit of 50% and amounts to at most 25%, and to only 8% for phosphate glasses. The fact that polarization decreases as decay increases indicates transmission of energy from the excited to the unexcited mols. due to quantum-mech. resonance. Absorption and emission by U both in glasses and in solns. are due to elec. dipoles. Polarization-yield and the mean life of the mols. in the excited state are almost independent of the concn. of the U atoms in the glass; this indicates very weak quantum-mech. resonance between excited and unexcited mols.

F. H. Rathmann

Zhur. Fiz.,

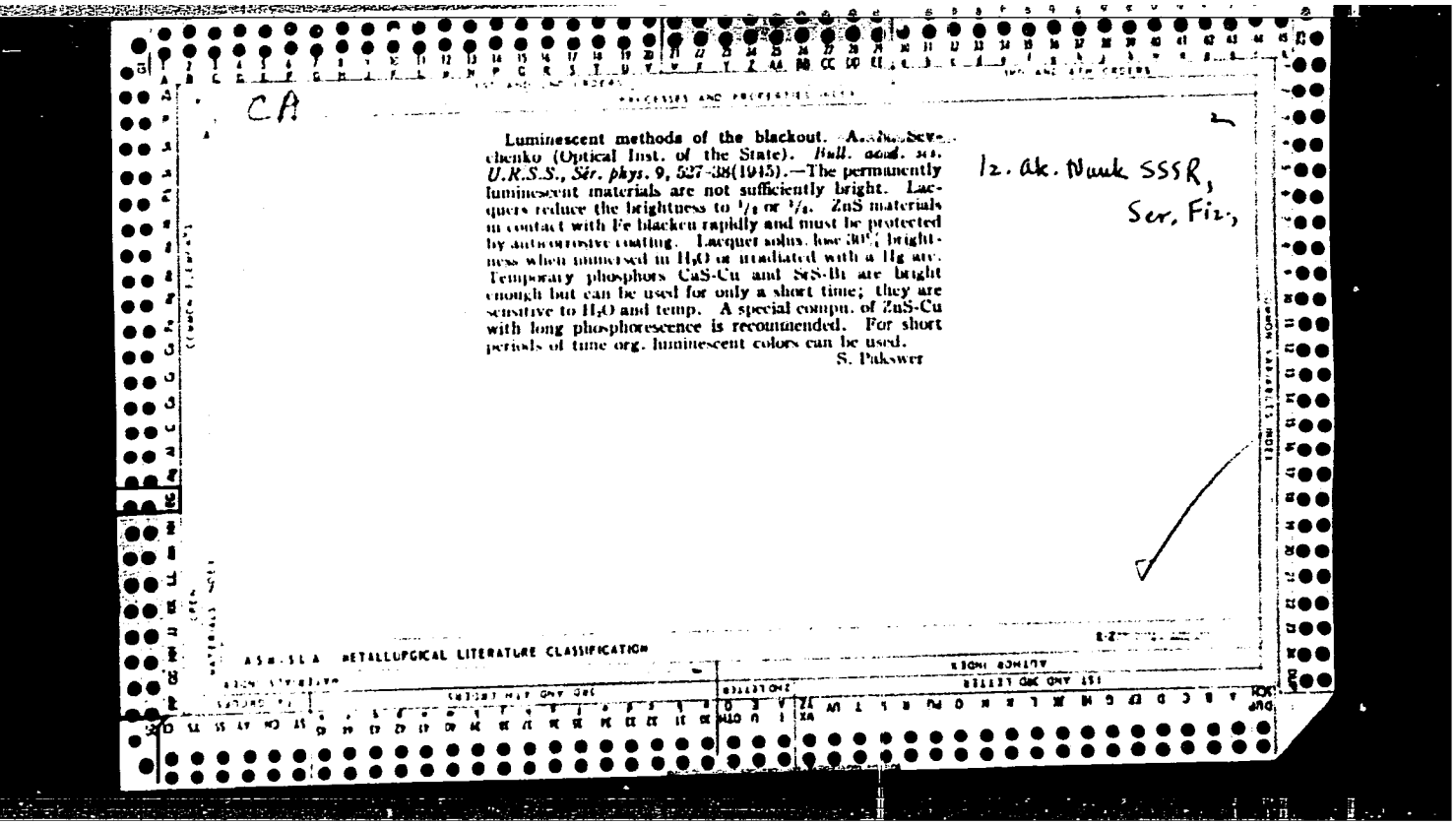
3

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

[illegible], A. . ; [illegible], I. . .

Luminescent materials accepted in a military sense.

An article found in "Optics for ilitary Use", Part I, published by the USSR Academy of Science, Moscow, 1945.



CA

Luminescent methods of the blackout. A. [illegible]chenko (Optical Inst. of the State). *Bull. acad. sci. U.R.S.S., Sér. phys.* 9, 527-38(1945).—The permanently luminescent materials are not sufficiently bright. Lacquers reduce the brightness to 1/5 or 1/8. ZnS materials in contact with Fe blacken rapidly and must be protected by anticorrosive coating. Lacquer solns. lose 30% brightness when immersed in H_2O or irradiated with a Hg arc. Temporary phosphors CaS-Cu and SrS-Bi are bright enough but can be used for only a short time; they are sensitive to H_2O and temp. A special compn. of ZnS-Cu with long phosphorescence is recommended. For short periods of time org. luminescent colors can be used.

S. Pakswer

Iz. Ak. Nauk SSSR, Ser. Fiz.,

Concentration depolarization of the photoluminescence of uranyl glasses. A. N. Sevchenko. *Zhur. Eksper. Teoret. Fiz.* 17, 1063-9(1947); cf. *C.A.* 39, 809⁶.—Increase of the concn. of UO_3 in a borosilicate glass, up to 10%, causes only 2–3% decrease of the limiting polarization ρ of the luminescence. Increase of the UO_3 content does, however, depress very strongly the intensity of the luminescence in monochromatic excitation. This effect is linked with a shortening of the life time, τ, of the excited state, as demonstrated with the aid of a Becquerel phosphoroscope. The relative yield of luminescence, L/L_0, falls with increasing UO_3 content. Thus, with 0.1, 1.0, 4.0, and 8.0% L/L_0 = 1.00, 0.90, 0.35, 0.08; $10^4\tau$ = 4.8, 4.4, 3.3, 2.2 sec.; τ/τ_0 = 1.00, 0.90, 0.69, 0.42; and L/τ = 0.21, 0.22, 0.11, 0.04. Thus, at low concns., the decrease of the yield is proportional to that of τ, but with further increasing concn. the yield falls much more rapidly than τ. In the range of proportionality, the quenching is evidently detd. by processes involving excited mols.—The behavior at higher concns. may be linked with the formation of new types of compds. between UO_3 and the glass, it being known that reduction of U^{6+} to U^{4+} results in disappearance of the luminescence. In the course of the decay of the luminescence, ρ decreases the faster, the higher the UO_3 content. Thus, from an initial ρ = 14%, the drop in 1.8×10^3 sec. was, with 8% UO_3, down to ρ = 2.5%, and with 1% UO_3, only to 5.6%. Interpretation by depolarization through Brownian motion is excluded on account of the high viscosity of the glass. The only plausible interpretation is by transfer of excitation energy to unexcited mols. due to quantum-mech. resonance between excited and unexcited mols. These resonance transfers are favored by higher concn., which results in a shortening of the distance between mols. That this is operative only in glasses, not in crystals where the absorbing and the emitting mols. have the same orientation, was demonstrated directly by detns. on a $K_2UO_2(SO_4)_2$ crystal, for which the initial ρ = 17% remained unchanged during the decay. The observed fall of τ/τ_0 and of L/L_0 with increasing UO_3 concn. in the glass is in accord with Vavilov's theory (*C.A.* 38, 1957⁴) developed for the luminescence of solns. of dyes. N. Thon

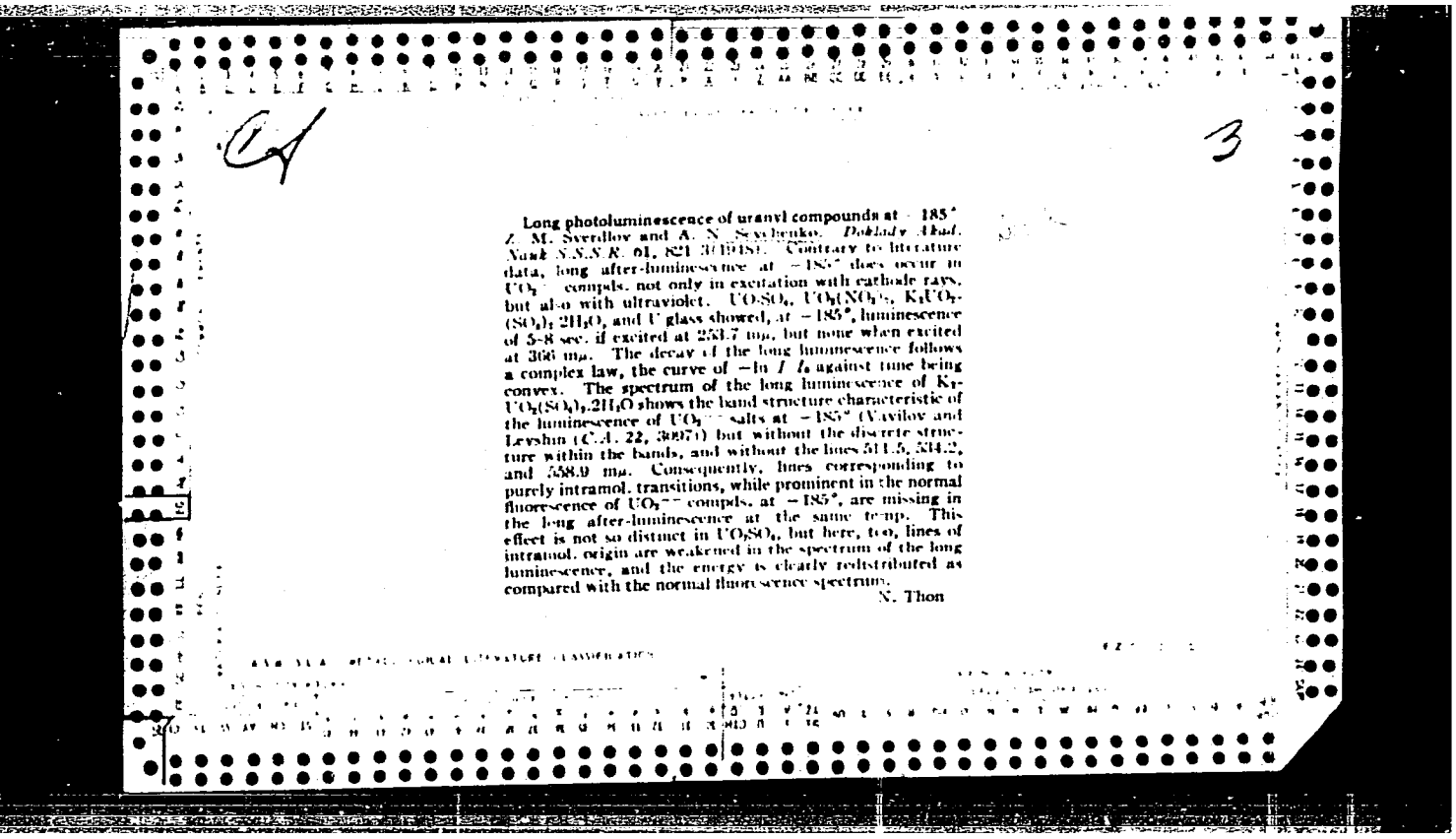
ANDRONNIKOV, K.S.; BALAKOV, V.V.; BUZHINSKIY, A.N.; BURAGO, A.N.; VENTMAN, L.A.; VISHNEVSKIY, A.A.; VOLOSOV, D.S.; GASSOVSKIY, L.N., professor; GERSHUN, A.A., professor; YEL'YASHEVICH, M.A.; YEVSTROP'YEV, K.S.; GUREVICH, M.M., professor; KOLYADIN, A.I.; KORYAKIN, B.M.; KURITSKIY, A.L.; PAPIYANTS, K.A.; PROKOF'YEV, V.K., professor; PUTSEYKO, Ye.K.; REZUNOV, M.A.; RITYN', N.E., SAVOST'YANOVA, M.V., professor; SEVCHENKO, A.N.; SENNOV, N.I.; STOZHAROV, A.I.; FAYERMAN, G.P., professor; FEOFILOV, P.P.; TSAREVSKIY, Ye.N., professor; CHEKHMATAYEV, D.P.; YUDIN, Ye.F.; KAVRAYSKIY, V.V., professor; VAVILOV, S.I., akademik, redaktor

[Optics in military science] Optika v voennom dele; sbornik statei. Pod red. S.I.Vavilova i M.V.Savost'ianovoi. Izd. 3-e, zanovo perer. i dop. Moskva. Vol.2. 1948. 387 p. (MLRA 9:9)

1. Akademiya nauk SSSR. 2. Sostaviteli - sotrudniki Gosudarstvennogo Opticheskogo instituta (for all except Vavilov and Kavrayskiy) 3. Voyenno-morskaya akademiya (for Kavrayskiy)
(Optics)

SEVCHENKO, A. N.

"Polarization of Photoluminescence in Uranyl Glasses," Dokl. AN SSSR, 42, No.8, 1948.



Long photoluminescence of uranyl compounds at −185°. Z. M. Sverdlov and A. N. Sevchenko. *Doklady Akad. Nauk S.S.S.R.* 61, 821-30(1948). Contrary to literature data, long after-luminescence at −185° does occur in UO_2^{++} compds. not only in excitation with cathode rays, but also with ultraviolet. UO_2SO_4, $UO_2(NO_3)_2$, $K_2UO_2(SO_4)_2 \cdot 2H_2O$, and U glass showed, at −185°, luminescence of 5-8 sec. if excited at 253.7 mμ, but none when excited at 366 mμ. The decay of the long luminescence follows a complex law, the curve of $-\ln I$ I_0 against time being convex. The spectrum of the long luminescence of $K_2UO_2(SO_4)_2 \cdot 2H_2O$ shows the band structure characteristic of the luminescence of UO_2^{++} salts at −185° (Vavilov and Levshin (C.A. 22, 3887)) but without the discrete structure within the bands, and without the lines 511.5, 534.2, and 558.9 mμ. Consequently, lines corresponding to purely intramol. transitions, while prominent in the normal fluorescence of UO_2^{++} compds. at −185°, are missing in the long after-luminescence at the same temp. This effect is not so distinct in UO_2SO_4, but here, too, lines of intramol. origin are weakened in the spectrum of the long luminescence, and the energy is clearly redistributed as compared with the normal fluorescence spectrum.

N. Thon

SEVCHENKO, A. N.

PA 36/49T96

USSR/Physics — Jan/Feb 49
Luminescence
Nuclear Physics - Uranium Compounds

"Luminescence of Uranyl Glass and Crystals," A. N. Sevchenko, State Opt Inst, 15 pp

"Iz, Ak Nauk SSSR, Ser Fiz," Vol XIII, No 1

Discusses polarization of uranyl glass versus chemical composition, concentration depolarization of luminescence in uranyl glasses, influence of temperature on polarization, on duration of luminescence, and on luminescence spectra of uranyl compounds, influence of water of crystallization on luminescence of uranyl crystals, and dependence

36/49T96

USSR/Physics (Contd) — Jan/Feb 49

of yield and duration of luminescence of uranyl-sulfate upon temperature. Also discusses two processes of extinguishing luminescence of uranyl borosilicate and alkali-silicate glasses at room temperature.

36/49T96

PA 152T97

USSR/Physics - Spectrum Analysis Dec 49
Chemistry - Uranyl Salts

"The Infrared Spectra of Uranyl Salts," A. N. Sevchenko, B. I. Stepanov, 8 pp

"Zhur. Eksper. i Teor[redacted] Fiz.," Vol XIX, No 12

Studied absorption spectra of four uranyl salts in region of 5-14 microns. Observed great number of overtones and compound frequencies. Succeeded in interpreting them by proceeding from values of fundamental frequencies: 803/cm, 200/cm, 920/cm. From comparison of the intensities of the bands with selection

[redacted] 152T97

USSR/Physics - Spectrum Analysis (Contd) Dec 49

standards, concluded the doubly positive ion UO_2^{++} in uranyl sulfate and uranyl potassium sulfate has "equicurvital" form, but in uranyl acetate and uranyl nitrate it appears almost linear. Observed influence of water of crystallization on relative intensities of separate bands. Frequencies of absorption bands do not vary for different amounts of water of crystallization. Submitted 29 Jun 49.

[redacted] 152T97

SEVCHENKO, A. N.

NSA

Chemistry

3264

LUMINESCENCE SPECTRA AND EXTINCTION OF URANYL COMPOUNDS. A. N. Sevchenko. Izvest. Akad. Nauk S.S.S.R. Ser. Fiz., 15, 613-23(1951) Sept.-Oct. (In Russian)

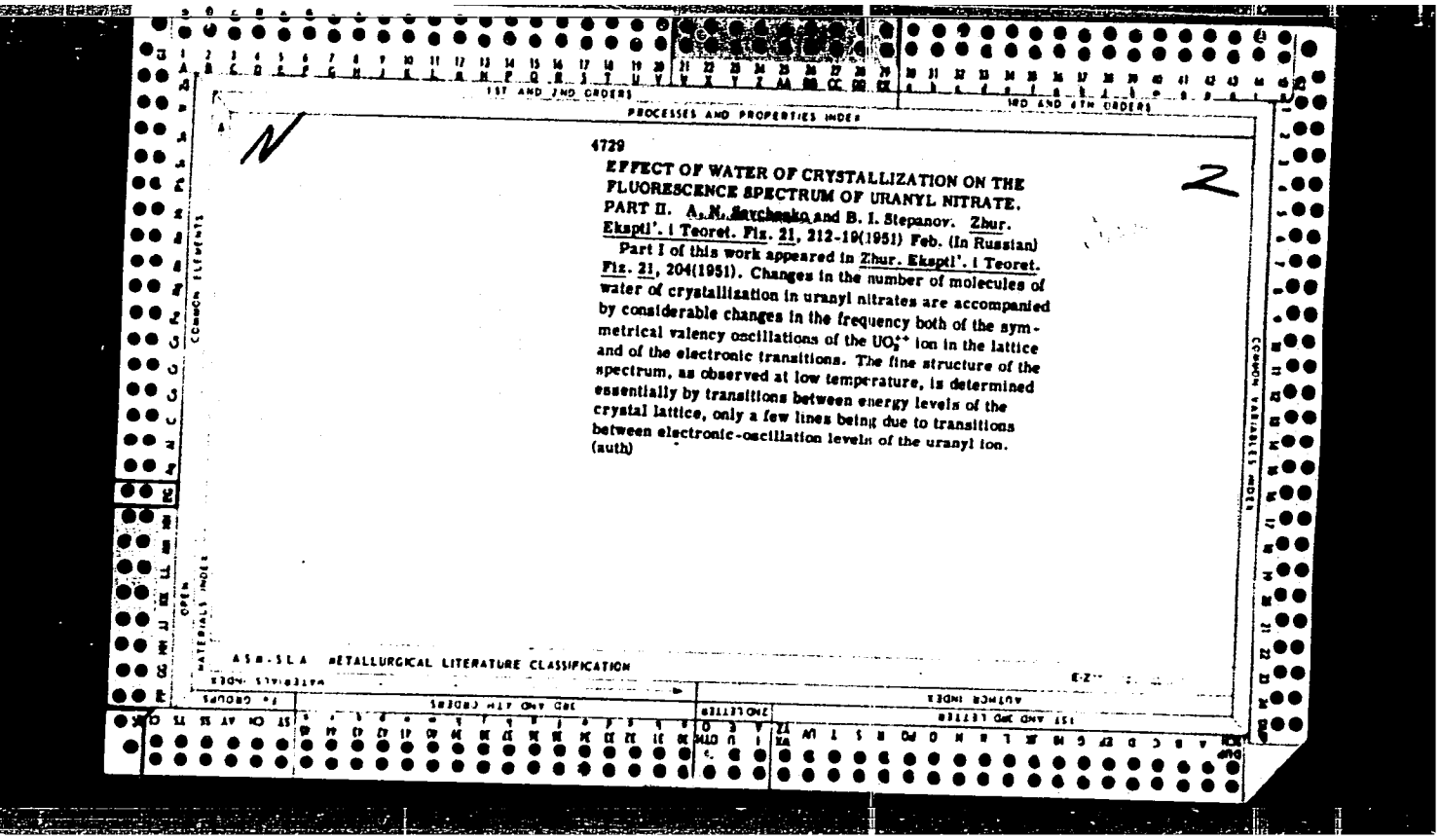
Effects of temperature on the luminescence spectra and extinction time of hydrated crystals and solutions of uranyl sulfate, nitrate, chloride, bromide, acetate, and phosphate are discussed. The variation of extinction time of uranyl nitrate with the number of associated H_2O or D_2O molecules is tabulated, and effects of solvent are shown graphically.

NSA

Chemistry

INVESTIGATION OF LUMINESCENCE OF INTERNAL COMPLEX COMPOUNDS OF SAMARIUM AND EUROPIUM WITH β-DIKETONES. A. N. Sevchenko and A. G. Morachevskiĭ. Izvest. Akad. Nauk S.S.S.R. Ser. Fiz., 15, 628-36(1951) Sept.-Oct. (In Russian)

Luminescence spectra of the nitrates, sulfates, acetates, acetylacetonates, benzoylacetonates, and dibenzoylmethanates of Sm and Eu, as crystals and in various solvents at several temperatures, are presented. Spectral lines are tabulated.



PROCESSES AND PROPERTIES INDEX

4729

EFFECT OF WATER OF CRYSTALLIZATION ON THE FLUORESCENCE SPECTRUM OF URANYL NITRATE. PART II. A. N. Sevchenko and B. I. Stepanov. Zhur. Eksptl'. i Teoret. Fiz. 21, 212-19(1951) Feb. (In Russian)

Part I of this work appeared in Zhur. Eksptl'. i Teoret. Fiz. 21, 204(1951). Changes in the number of molecules of water of crystallization in uranyl nitrates are accompanied by considerable changes in the frequency both of the symmetrical valency oscillations of the UO_2^{++} ion in the lattice and of the electronic transitions. The fine structure of the spectrum, as observed at low temperature, is determined essentially by transitions between energy levels of the crystal lattice, only a few lines being due to transitions between electronic-oscillation levels of the uranyl ion. (auth)

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

CA

Effect of water of crystallization on the fluorescence spectrum of uranyl nitrate. I. A. S. Sachenko, V. M. Vdovenko, and E. A. Kovaleva. *Zhur. Eksptl. i Teoret. Fiz.* 21, 201-11(1951).—Fluorescence spectra were detd. at 185° under ultraviolet excitation for 9 carefully crystd. and analyzed samples of $UO_2(NO_3)_2$ (I) (H_2O content exact within ±0.2% of the formula): anhyd.; with $6H_2O$ or $6D_2O$, with $3H_2O$ or $3D_2O$; with $2H_2O$ or $2D_2O$; with $1H_2O$ or $1D_2O$. Salts with 4 or $5H_2O$ could not be prepd. in a stable form. Wave numbers, line widths, and intensities are tabulated. The following are, for each salt, the extreme wave numbers and the no. of lines catalogued: $I.6H_2O$, 20670-15885 cm.$^{-1}$, 76 lines; $I.6D_2O$, 20684-15379, 69; $I.3H_2O$, 20903-15303, 100; $I.3D_2O$, 20777-15375, 43; $I.2H_2O$, 20973-16327, 32; $I.2D_2O$, 20775-15405, 85; $I.1H_2O$, 20818-15405, 36; $I.1D_2O$, 14; I(anhyd.) 20805-16270, 33 lines. The majority of the lines are diffuse bands 20-30 cm.$^{-1}$ wide, but there are also narrow lines. For $I.6H_2O$, the newly detd. wave lengths are in agreement with those given by Nichols and Howes (*C.A.* 14, 2584), but the latter have missed most of the weaker lines. For $I.2H_2O$ and $I.1H_2O$, the new data disagree considerably with those of N. and H. The fluorescence spectra are considerably altered by a change of the no. of H_2O mols.; there are shifts of the whole spectrum, changes of the relative position of the lines, disappearance of certain lines and appearance of new lines, and changes of intensity distribution. In all cases, the spectrum can be divided into definite groups of lines, with a const. distance, 860 cm.$^{-1}$, between corresponding lines of different groups. Replacement of H_2O by D_2O does not give rise to major differences in $I.6H_2O(6D_2O)$, but there are considerable differences in salts with 3, 2, and $1H_2O(D_2O)$. In particular, the no. of lines in $I.2D_2O$ is much greater than in $I.2H_2O$, although visually the mean densities of the whole plates appear about equal. The difference between the spectra of salts with D_2O and H_2O is greater the lower is the hydrate. At 20°, lines of each group merge into one broad band about 400-500 cm.$^{-1}$ wide, without visible line structure, and within each such band the max. is strongly shifted to the red (by up to 100-150 cm.$^{-1}$) as compared with the position of the max. in the line group at -185°. II. A. N. Sevchenko and B. I. Stepanov. *Ibid.* 212-19.—Each of the above spectra can be divided into 6-7 groups; to each line of any group, there are, generally, corresponding lines in all other groups, and the intensity distributions within each group are approx. the same. The distance between analogous lines of different groups varies between 830 and 880 cm.$^{-1}$, and corresponds undoubtedly to the fully symmetrical 860-cm.$^{-1}$ vibration of the UO_2^{++} ion in the ground state. The interpretation of the *a* lines of each group as corresponding to the antisymmetrical 930-cm.$^{-1}$ vibration of the UO_2^{++} ion (Dieke and Duncan, *National Nuclear Energy Series*, Vol. II, *Spectroscopic Properties of U Compds.*, 1949 (*C.A.* 43, 7830*h*)) is not contested, but D. and D.'s attempt to assign a large no. of lines to deformation vibrations of the ion is considered wrong on the following grounds: (*a*) the alleged vibration frequencies are very strongly dependent on the type of the mol., (*b*) are very weak in $I.6H_2O$ although permitted by selection rules, (*c*) are practically the same in different groups, i.e., show no anharmonicity, in contrast to the 860- and 930-cm.$^{-1}$ frequencies, (*d*) never appear in harmonics, (*e*) show different polarizations, (*f*) show no isotopic shift on enrichment with O^{18}. The line structure within each group can be attributed either to transitions between different electronic-vibrational levels of the UO_2^{++}

tion, or to transitions between energy levels of the crystal lattice. The 1st hypothesis, favored by M. and R. Freyman (*J. phys. radium* 9, 158(1948); *C. A.* **43**, 3295*a*), involves the impossible existence of transitions from vibration levels with energies up to 1100, or even (in absorption) up to 2200 cm.$^{-1}$. Only the 2nd hypothesis is consistent with the observed (see above) dependence of the spectrum on the no. of crystn. H_2O mols. and its sensitivity to replacement of H_2O by D_2O. The effect of the crystal lattice can consist in a modification of the vibration frequencies of the UO_2^{++} ion due to the change of the force field acting thereon, or in a modification of the energy levels of the lattice itself. Analysis of the spectra shows that from the anhyd. I to $I\,6H_2O$, $6D_2O$ the frequency of the purely electronic transition decreases from 20802 to 20508, i.e., by about 300 cm.$^{-1}$. The frequencies of the fully symmetrical vibrations of the UO_2^{++} ion show distinct even though only slight anharmonicity; these frequencies are (in the order I anhyd., $1H_2O$, $2H_2O$, $2D_2O$, $3H_2O$, $3D_2O$, $6H_2O$, $6D_2O$), for $v = 1 \rightarrow 0$, 882, 882, 871, 874, 874, 871, 865, 865; $v = 2 \rightarrow 1$, 878, 878, 871, 871, 871, 871, 853, 853; $v = 3 \rightarrow 2$, 875, 875, 858, 858, 858, 858, 861, 861 cm.$^{-1}$. Examn. of an extensive table of frequencies counted from the frequency of the 1st (or) line of each group shows that the sequence of sublevels is independent of the quantum no. of the valence vibration, i.e., is the same for all vibration levels. This result, which also emerges from an analysis of Samoilov's spectra of UO_2 salts at the temp. of liquid He (*C. A.* **43**, 1185*f*), is inconsistent with an interpretation of the fine structure by transitions between vibration levels of the UO_2^{++} ion, but does not the interpretation which links that structure with changes of energy of the crystal lattice. This point of view is corroborated by the near identity of the frequency differences in $I\,2H_2O$, $2D_2O$, $3H_2O$, and $3D_2O$. As for these salts, the purely electronic and the symmetrical-vibration frequencies are also identical, it follows that the positions of the levels of the crystal lattice coincide. The same applies to the pairs $I\,6H_2O$ and $6D_2O$, and $I\,3H_2O$ and Ianhyd. An interpretation of the fine structure by transitions between levels of the UO_2^{++} ion would conflict with the absence of changes of frequency differences within line groups from one salt to another; therefore, its source must be sought outside the UO_2^{++} ion, i.e., in the lattice. The observed significant changes in intensity distribution accompanying, in particular, the replacement of H_2O by D_2O in salts of the same type may be indicative of a superposition of several independent spectra, with weights depending on the nature of the salt.

N. Thon

USSR/Physics - Photoluminescence Feb 51

"Investigation of Photoluminescence of Benzoyl Acetonates of Europium and Samarium," A. N. Sevchenko, A. K. Trofimov

"Zhur. Eksper. i Teoret. Fiz.," Vol XXI, No 2, pp 220-229

Authors did not find discrete structure in absorption spectra of subject substances. Concluded photoluminescence depends on nature of solvent and on temp. Studies of extinguishment laws and extinction processes of luminescence of benzoyl acetonate of europium showed decrease of quantum output is followed by simultaneous decrease of extinguishment const. Detected and measured polarization of luminescence.

LC 180T102

SEVCHENKO, A.N.

The Committee on Stalin Prizes (of the Council of Ministers USSR) in the fields of science and inventions announces that the following scientific works, popular scientific books, and textbooks have been submitted for competition for Stalin Prizes for the years 1952 and 1953. (Sovetskaya Kultura, Moscow, No. 22-40, 20 Feb - 3 Apr 1954)

Name	Title of Work	Nominated by
Sevchenko, A.N.) Stepanov, B. I.)	"Investigation of the Luminescence of Uranyl Compounds"	Academy of Sciences Belorussian SSR

SO: W-30604, 7 July 1954

SEVCHE'KO, A. N.

SEVCHENKO, A. N. - "Investigation of the Photoluminescence of Uranyl Compounds." Sub 3 Mar 52, Physics Inst imeni P. N. Lebedev, Acad Sci USSR. (Dissertation for the Degree of Doctor in Physicomathematical Sciences).

SO: Vechernaya Moskva January-December 1952

STEPANOV, B.I.; SEVCHENKO, A.N., redaktor; ALEKSANDROVICH, Kh., tekhnicheskiy redaktor

[Luminescence of complex molecules] Liuminestsentsiia slozhnykh molekul. Minsk, Izd-vo Akademii nauk BSSR. Pt.1. 1955. 325 p. (MLRA 9:9)
(Luminescence) (Molecules)

SEVCHENKO, A.N.

USSR/Chemical Technology. Chemical Products and Their Application -- Silicates. Glass. Ceramics. Binders, I-9

Abst Journal: Referat Zhur - Khimiya, No 2, 1957, 5170

Author: Sevchenko, A. N.

Institution: Academy of Sciences USSR

Title: Use of Luminescence Method in the Study of Vitreous State

Original Publication: Sb. Stroyeniye stekla, M.-L., AN SSSR, 1955, 207-215

Abstract: It is shown that polarization spectra of uranyl glasses provide a very sensitive characteristic of composition and structure of the glass. Quantum yield of luminescence of uranyl glasses and duration of excitation state are strongly dependent on chemical composition of glasses and the temperature. The curves of temperature dependence of quantum yield and duration of excitation state of uranyl glasses are located between the corresponding curves of the crystals and solutions. Hence, the vitreous state must be regarded as intermediate between crystalline and liquid state. Study of the attenuation

Card 1/2

USSR/Chemical Technology. Chemical Products and their Application. J-12
Glass. Ceramics. Building Materials.

Abs Jour: Referat Zh.-Kh., No 8, 1957, 27619

Author : A.N. Sevchenko.
Inst :
Title : Retort to Ye. F. Gross.

Orig Pub: vSb: Stroyeniye stekla. M.-L., AN SSSR, 1955, 324.

Abstract: Remark of the author that the frequencies of infrared absorption spectra measured by V.A. Florinskaya positively characterize the vibrations of silica. See also RZhKhim, 1957, 5166 and 5169.

Card : 1/1

SEVCHENKO, A.N.

USSR/Physical Chemistry - Molecule, Chemical Bond. B-4

Abs Jour : Referat Zhur - Khimiya, No 1, 1958, 90

Author : A.N. Sevchenko, L.V. Volod'ko

Inst : Academy of Sciences of USSR

Title : Luminescence of Solutions of Uranyl Salts.

Orig Pub : Izv. AN SSSR, Ser. fiz., 1956, 20, No 4, 464-470

Abstract : The luminescence (L) of solutions of uranyl salts in various organic solvents was investigated. It was shown that L always was observed, if the solution temperature had been low enough. This shows that the "absence" of L of uranyl salts in organic solvents at room temperature is connected with quenching by the temperature. There are no sharp bands characteristical of crystal spectra in the observed spectra. The general appearance of a sectrum depends essentially on the solvent and strongly differs

Card 1/2

SEVCHENKO, A. N.

16(1); 24(4,5) PHASE I BOOK EXPLOITATION SOV/1899

Akademiya nauk Belorusskoy SSR. Institut fiziki i matematiki

Trudy, vyp. 2. (Transactions of the Institute of Physics and Mathematics, Belorussian SSSR Academy of Sciences, Nr 2) Minsk, 1957. 283 p. Errata slip inserted. 750 copies printed.

Ed.: B. I. Stepanov, Academician, BSSR Academy of Sciences; Ed. of Publishing House: L. Marike; Tech. Ed.: I. Volokhanovich.

PURPOSE: This book is intended for mathematicians, physicists, and graduate students in mathematics and physics.

COVERAGE: This book contains a series of articles on recent contributions by members of the Institut fiziki i matematiki (Institute of Physics and Mathematics) of the Academy of Sciences, BSSR, in the fields of radiation, luminescence, optics, and spectroscopy and on the applications to physics of analysis, tensor analysis, linear groups, theory of adjustments, and differential equations. The

Card 1/5

AVAILABLE: Library of Congress (QC1. A46A3)

Card 5/5

LK/fal
8-13-59

GURINOVICH, G.P.; SEVCHENKO, A.N.

Determination of the nature of an elementary emitter for the case of noncoincidence of directions of absorption and radiation oscillators. Trudy Inst.fiz. i mat. AN BSSR no.2: 3-18 '57. (MIRA 12:1)
(Luminescence)

Sevchenko, A.N.

51-3-6/14

AUTHORS: Gurinovich, G. P., Yermolenko, I. N., Sevchenko, A. N. and Solov'yev, K. N.

TITLE: Certain Optical Properties of Chlorophyll and Metal Derivatives of Pheophytin. (Nekotoryye opticheskiye svoystva khlorofilla i metalloproizvodnykh feofitina.)

PERIODICAL: Optika i Spektroskopiya, 1957, Vol.III, Nr.3, pp.237-245. (USSR)

ABSTRACT: Absorption and polarized luminescence spectra of chlorophyll, chlorophyllide, pheophytin and metal derivatives of pheophytin were studied. Chlorophyll was obtained from leaves of nettle. Chlorophyllide was produced by fermentation of Heracleum leaves. Pheophytin was prepared by a method described earlier (Refs.4, 5). Metal derivatives of pheophytin were produced by adding to an alcohol solution of pheophytin dry salts of metals (mainly acetates). These solutions were kept at room temperature for 20 hours and then heated at 50°C for 2 hours. Spectra of polarization of luminescence of the solutions of chlorophyll, chlorophyllide, pheophytin, and absorption spectra of the same three substances are

Card 1/3

Certain Optical Properties of Chlorophyll and Metal Derivatives of Pheophytin.

pheophytin molecule its structural characteristics become similar to those of chlorophyll. This seems to indicate that the structures of molecules of metal derivatives of pheophytin and of chlorophyll are similar. Luminescence yield of chlorophyll (Figs.7, 8, 9) and its derivatives was found to depend on viscosity of the solvent. With the increase of viscosity the luminescence yield decreases. The authors thank Professor T. N. Godnev for his interest and advice. There are 9 figures, 2 tables and 17 references, 11 of which are Slavic.

SUBMITTED: January 3, 1957.

AVAILABLE: Library of Congress

GURINOVICH, G.P.; YERMOLENKO, I.N.; SHVCHENKO, A.N.; SOLOV'YEV, K.N.

Electron spectra of chlorophyll and metal derivatives of pheophytin. Fiz. sbor. no.3:375-381 '57. (MIRA 11:8)

1. Institut fiziki i matematiki AN Belorusskoy SSR.
(Chlorophyll--Spectra) (Pheophytins--Spectra)

SEVCHENKO, A.N.

Life and activities of Academician Sergei Ivanovich Vavilov.
Uch.zap.BGU no.32:3-15 '57. (MIRA 11:12)
(Vavilov, Sergei Ivanovich, 1891-1951)

20-117-5-19/54

AUTHORS: Sevchenko, A. N., Member of the Academy of Sciences of the Belorussian SSR, Gurinovich, G. P.

TITLE: The Determination of the Character of the Elementary Absorption and Radiation Oscillators With Non-Coinciding Directions (Opredeleniye prirody elementarnogo izluchatelya dlya nesovpadayushchikh po napravleniyu ostsillyatorov pogloshcheniya i izlucheniya).

PERIODICAL: Doklady AN SSSR, 1957, Vol. 117, Nr 5, pp. 798 - 801 (USSR)

ABSTRACT: The investigations conducted here at various angles with respect to the direction of the exciting light and at various directions of the oscillations of the electric vector of the exciting light permitted the determination of the nature of the elementary processes of absorption and emission of light by matter. (references 1,2,3). This method is not only suited for the determination of oscillators which are directed parallel, but just as well of oscillators rotated through the angle α with respect to each other. At the beginning a formula for the degree of polarisation is given. The expressions obtained by extensive, however, elementary computations holding for the degree of polarisation (being the function of two angles) are given here for the following cases: Absorbing and emitting electric dipole. Electric dipol and electric quadrupole. Electric quadrupole and electric quadrupole.

Card 1/3

The Determination of the Character of the Elementary Absorption and Radiation Oscillators With Non-Coinciding Directions.

appears useful to represent the formulae deduced here in a graphical form in their practical application. There are 1 figure, 6 references, 5 of which are Slavic.

SUBMITTED: July 18, 1957

Card 3/3

Luminescence Spectra of Complex Uranyl Compounds. I.

uranyl nitrate (with ether, acetone and dioxane in the crystal lattice) are identical with the spectra of hydrates of the same nitrate. The negative results of Freyman et al. (Refs.4-5) could be due to the presence of the usual hydrates of uranyl nitrate in all their samples. These hydrates might be formed by the action of atmospheric moisture. To avoid the effects of atmospheric moisture the present authors developed a technique described below. Fig.1 shows the apparatus used to prepare complex uranyl salts. Hydrated salt was placed in a test tube 1, which was joined to a bulb 2 filled with silica gel and connected to a vacuum pump. Vessel 3, connected by a tap 4 to the test tube 1, was filled with a dehydrated liquid

 whose molecules were to replace the molecules of water

Luminescence Spectra of Complex Uranyl Compounds. I.

of crystallization in the uranyl salt used. The uranyl salt was dehydrated by heating under vacuum for 4-6 hours at 120-150°C. The temperature was held constant by using a glycerine bath 5 (Fig.1) and a heater with a thermostat. The degree of dehydration was controlled visually by means of luminescence spectrum analysis. Crystallization of complex uranyl salts was carried out at room temperature without access to atmosphere. The luminescence spectra were studied at the liquid-air temperature. The spectra were excited by means of 320-420 mμ frequencies from a mercury lamp. A triple-prism glass spectrograph ИСП-51 was used. The majority

Card 3/6 of lines in the spectrogram were unusually narrow and

Luminescence Spectra of Complex Uranyl Compounds. I.

sharp. Tables 1-6 give the values of wave-numbers and relative intensities of the lines in the fluorescence spectra of complex salts of uranyl nitrate with diethyl ether, ethyl acetate, nitromethane, acetone, methyl alcohol and ethyl alcohol at the liquid-air temperature. Tables 7-9 give similar results for the fluorescence spectra of complex salts of uranyl acetate with ethyl, methyl and isoamyl alcohols. Comparison of the results obtained shows that replacement of molecules of water of crystallization in uranyl salts by molecules of organic substituents causes clear changes in the discrete structure of electron spectra. The number of lines in the spectrum increases on such replacements. The lines become narrower and sharper compared with the

 lines of atomic spectra. The intensities of various

frequencies become more nearly equal along the spectrum. These changes are clearly shown in Fig.2, where microphotograms of luminescence spectra of uranyl nitrate complexes with diethyl ether (1) and acetone (2) and uranyl nitrate hexahydrate (3) are given. The luminescence spectra of different complex salts differ strongly, depending on the chemical nature of the anion or the molecule which replaces water of crystallization. Thus the present results contradict the conclusions of Freyman et al. (Refs. 4-5). A more detailed analysis of the results obtained will be given in the following paper. There are 9 tables, 2 figures and 6 references,

 of which 3 are Russian, 2 French and 1 American.

51-4 -1-5/26

Luminescence Spectra of Complex Uranyl Compounds. I.

ASSOCIATION: Belorussian State University imeni V.I. Lenin, Minsk. (Belorusskiy gosudarstvennyy universitet im. V. I. Lenina, Minsk.)

SUBMITTED: March 23, 1957.

AVAILABLE: Library of Congress.

1. Uranyl compounds-Luminescence-Spectra

Card 6/6

SOV/51-4-1-6/26

AUTHORS: Volod'ko, L. V. and Sovchenko, A. N.

TITLE: Luminescence Spectra of Complex Uranyl Compounds. II. (Spektry lyuminestsentsii kompleksnykh uranilovykh soyedineniy. II)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol.IV, Nr.1, pp. 47-54. (USSR)

ABSTRACT: This paper is the continuation of the preceding one. Fig.1 gives the fluorescence spectra (frequencies and intensities) of complex salts of uranyl nitrate with ethyl alcohol (1), methyl alcohol (2), nitromethane (3), acetone (4), ethyl acetate (5), ether (6), of anhydrous uranyl nitrate (7) and of uranyl nitrate hexahydrate (8). Fig.2 gives the fluorescence spectra of uranyl acetate with isoamyl alcohol (1), ethyl alcohol (2), methyl alcohol (3), of anhydrous uranyl acetate (4) and of uranyl acetate dihydrate (5). Table 1 gives the values of frequencies of the electron transition ν_e, and of valence symmetrical ν_α, anti-symmetrical ν_β

Card 1/4

Luminescence Spectra of Complex Uranyl Compounds. II.

and deformational ν_γ vibrations of the uranyl ion, present in the first four groups of lines in the spectra of complex compounds of uranyl nitrate. It follows from Table 1 that uranyl ion vibrations are anharmonic. Departures from harmonicity are, however, not great, and they depend on the nature of molecules present in the crystalline lattice. Table 2 gives the relative intensities and the values of the frequency differences $\Delta\nu = \nu'_a - \nu$ for the first four groups of lines in the luminescence spectra of uranyl nitrate and uranyl acetate salts. It follows from Table 2 that the structure of the luminescence spectra of uranyl salts cannot be explained only by transitions between electron-vibrational energy levels

 of the UO_2^{++} ion. According to Table 1 the frequencies

Luminescence Spectra of Complex Uranyl Compounds. II.

of vibrations of the uranyl ion change on transition from one group of lines to another due to anharmonicity of symmetrical vibrations, and from one salt to another because of changes in the energy of electron transitions. Thus the differences $\Delta\nu$ in Table 2 should change from group to group and from substance to substance while actually this is not observed. In the spectrum of a given salt the differences $\Delta\nu$ in all groups remain constant within the experimental errors. It is concluded that the fine structure of the luminescence spectra of complex uranyl salts at low temperature is due, mainly, to intramolecular vibrations. This agrees well with the analysis put forward by Sevchenko and Stepanov (Refs.1-2), who ascribed the fine structure

Luminescence Spectra of Complex Uranyl Compounds. II.

to transitions between the energy levels of the crystalline lattice. The analysis of Refs.1-2 is applicable to the spectra of uranyl salts of different chemical composition without the necessity of additional hypotheses. In addition to crystalline lattice vibrations, certain differences $\Delta\nu$ in Table 2 may be due to, e.g. transitions between electron-vibrational levels of the uranyl ion. The number of such lines in the spectrum is not large. There are 2 figures, 2 tables and 6 references, of which 4 are Russian, 1 English and 1 American.

ASSOCIATION: Belorussian State University imeni V.I. Lenin, Minsk. (Belorusskiy gosudarstvennyy universitet im. V. I. Lenina, Minsk.)

SUBMITTED: March 23, 1957.

AVAILABLE: Library of Congress.

Card 4/4 1. Uranyl nitrates-Fluoresence-Spectra

SOV/48-22-11-30/33

24(7)

AUTHORS: Gurinovich, G. P., Sevchenko, A. N.

TITLE: Dependence of the Degree of Polarization Upon the Wavelength of Fluorescence (Zavisimost' stepeni polyarizatsii ot dliny volny fluorestsentsii)

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1958, Vol 22, Nr 11, pp 1407-1411 (USSR)

ABSTRACT: This is an experimental investigation of the polarization versus excitation- and luminescence wavelength function. The measurements were carried out with a device, the block scheme of which is portrayed in figure 1. In figure 2 curves describing the function in question are given for 3-monomethyl-amino-phthalimide in glycerin, which exhibits a well-pronounced mirror symmetry. The absorption- and emission spectra were obtained by L. G. Pikulik. It turns out that the polarization evidently decreases at a further departure from the frequency of the pure electron transition the rule of mirror symmetry and of polarization still being satisfactorily satisfied. Similar measurements were carried out with fluorescein and thiocyanide 6 (extra)(Tables 1, 2).

Card 1/3

Dependence of the Degree of Polarization Upon the Wavelength of Fluorescence

The evidence presented in the tables offers a substantiation of theoretical considerations. As is known the theoretical value of polarization in isotropic solutions equals 1/2 . Experimental data for 3-mono-methyl-amino-phthalimide are given in table 3. It indicates that depolarizing factors can be found. If excitation is effected with light having the same frequency as that of the pure electron transition and the polarization is measured at the respective place, there are reasons to believe that even higher values of polarization may be obtained. This is, however, connected with certain experimental difficulties. The polarization versus the luminescence wavelength function was also investigated for dyes of a porphine type. The experiments showed a pronounced dependence, which is basically different from the analogous functions of other dyes. The experimental results presented are in good accordance to the measurements carried out with fluorescence spectra. The authors express their gratitude to T. N. Godnev for making available certain preparations. There are 5 figures, 3 tables, and 10 references, 7 of which are Soviet.

SOV/48-22-11-30/33

Dependence of the Degree of Polarization Upon the Wavelength of Fluorescence

ASSOCIATION: Institut fiziki i matematiki AN BSSR
(Institute of Physics and Mathematics, AS Belorussian SSR)

Card 3/3

SOV/48-22-11-31/33

24(7)

AUTHORS: [illegible]rznevskiy, A. M., Sevchenko, A. N.

TITLE: On the Polarization of the Luminescence of Phthalimides (O polyarizatsii lyuminestsentsii ftalimidov)

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1958, Vol 22, Nr 11, pp 1412-1416 (USSR)

ABSTRACT: A relation between luminescence polarization temperature and viscosity is given by the well-known formula by Levshin - Perren:

$$\frac{1}{P} = \frac{1}{P_0} + \left(\frac{1}{P_0} - \frac{1}{3}\right)\frac{kT}{V\eta}\tau \qquad (1)$$

According to this formula the relationship between $1/P$ and T/η is linear, and this was substantiated by the results obtained from all phthalimides investigated (Fig 1). The luminescence polarization decreases rapidly with rising temperature. Similar dependences were also found in all phthalimide derivatives which were studied. The dependence of the polarization upon the kind of solvent was also investigated (Fig 2). The information gained demonstrates that the formula by Levshin and Perren also applies to this class of phthalimides and that the correspondence

Card 1/3

On the Polarization of the Luminescence of Phthalimides

between the molar and the molecular viscosity is maintained. This formula also offers a means of determining the volume of the molecule and the surrounding solvate shell. The molecular volumes of phthalimides were determined in various solvents and in their mixtures. The fluorometer due to Bonch-Bruyevich (Table 1) was used in the experiments. The molar volumes of the dissolved phthalimides considerably increase as compared to those in solid state. A similar solvatation occurs also with other molecules. Fluorescein, thiocyanate B and chlorophyll were investigated in order to provide a check of the results obtained. Their molar volumes were determined by the diffusion method due to **Marinesco** (Ref 2). Measurements with these substances in identical solvents furnished a good accordance of the results. Contrary to this, the results presented by Gribkov and Zhevandrov (Ref 3), and by Zhevandrov and Nikolayev (Ref 4) which were obtained by the same method, do not agree, neither with each other nor with the results of this work. At the same time polarization spectra of 11 phthalimide derivatives were investigated. Polarization- and absorption spectra are reliable indicators of the chemical structure of a substance. The nature

SOV/48-22-11-51/34

On the [illegible] of the luminescence of phthalimides

of the elementary excitation are determined by the method of . I. Levshin. As a practical example three structural lines are given for 4-amino-n-methyl phthalimides (Fig 4). The data obtained for other phthalimides indicate a dipole character of absorption and emission. The authors express their gratitude to V. V. Zelinskiy for furnishing preparations and to L. M. Bonch-Bruyevich, V. I. Shirokov, and G. A. Vishnevenko for assistance with the measurements. There are 4 figures, 2 tables, and 9 references, 8 of which are Soviet.

ASSOCIATION: Institut fiziki i matematiki AN B SSR (Institute of Physics and Mathematics, AS Belorussian SSR)

Card 3/3

SOV/48-22-11-33/33

24(7).
AUTHORS: Zhevandrov, N. D., Galanin, M. D., Sevchenko, A. N.

TITLE: Discussion of the Lectures Held by A. M. Sarzhevskiy, A. N. Sevchenko, and P. P. Nepochatykh (Prenlya po dokladam A. M. Sarzhevskogo i A. N. Sevchenko: P. P. Nepochatykh)

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1958, Vol 22, Nr 11, pp 1420-1420 (USSR)

ABSTRACT: N. D. Zhevandrov comments on the lecture by A. M. Sarzhevskiy and A. N. Sevchenko: The divergence between the molecular volumes determined experimentally can easy be explained, as the data presented in the respective papers were obtained after an interruption of three years and with different lots of glycerin. As regards the interpretation of the results with respect to the solvate shells or with respect to the macro- and micro-viscosity, this seems to be only hair-splitting, because the physical nature of the phenomenon is essentially that of the interaction of the fields of the dissolved molecules and of the solvent molecules.
M. D. Galanin advances remarks concerning the above mentioned lectures: He criticises the application of Perren's formula to

Card 1/2

Discussion of the Lectures Held by A. M. Sarzhevskiy, A. N. Sevchenko, and P. F. Nepochatykh

the determination of the molecular volume and in particular to a decision on the problem of the solvate shells. An agreement between the values of molecular volumes determined and the actual volumes of the molecules can only be expected to keep within the range of orders of magnitude. In this connection the results must be taken for an indication of the fact that micro- and macro-viscosity are about equal.

A. N. Sevchenko answers: The information provided gives rise to the assertion that the shape of the molecules in the solvent is approximately spherical. The fact that the solvate shell volumes found by independent methods (Perren, Marinesco, agree with each other may serve as direct proof of the accuracy of the respective methods. Hence the remarks by M. D. Galanin are not convincing.

USCOMM-DC-60,863

SOV/81-59-16-56084

Translation from: Referativnyy zhurnal. Khimiya, 1959, Nr 16, p 12 (USSR)

AUTHORS: Sevchenko, A.N., Umrenko, D.S.

TITLE: Luminescence Spectra of Crystalline Uranyl Phosphate Salts

PERIODICAL: Uch. zap. Belorussk. un-t, 1958, Nr 41, pp 27-39

ABSTRACT: The luminescence spectra of the uranyl salts of the ortho- and pyrophosphoric acids at room temperature and -180°C are investigated. In the luminescence spectra of uranyl phosphates at 20°C the frequency difference between adjacent bands, which corresponds to the frequency of the full-symmetric oscillation of UO_2^{2+} in the ground state, is equal to $\sim$810 cm^{-1} which is 50 cm^{-1} less than in uranyl sulfates, uranyl nitrates, etc. The increase in the number of molecules of crystallization water leads also to the lowering of the frequency of oscillation of UO_2^{2+} (796 cm^{-1} in $2NaUO_2PO_4 \cdot 6H_2O$ as compared with 814 cm^{-1} in $2NaUO_2PO_4 \cdot 3H_2O$). The lowering of the temperature to -180°C leads to the resolution of the fine structure of the luminescence spectra caused by the combination of the electron transition with full-symmetric, anti-symmetric and defective oscillations of UO_2^{2+} and also with oscillations of the crystalline lattice,

Card 1/2

Luminescence Spectra of Crystalline Uranyl Phosphate Salts SOV/81-59-16-56084

as has been shown by Sevchenko and Stepanov (Zh. eks., teor. fiz). The intensity of the luminescence and the mean duration of the excited state of the uranyl phosphate decrease with the substitution of PO_4^{3-} by $P_2O_7^{4-}$.

V. Yermolayev.

Card 2/2

24(4)
AUTHORS: Sevchenko, A. N., Academician, Academy of Sciences Belorussian SSR, Gurinovich, G. P.

SOV/20-123-1-15/56

TITLE: The Polarization of Luminescence in the Case of Excitation by Polarized and Natural Light (Polyarizatsiya lyuminestsentsii pri vozbuzhdenii polyarizovannym i yestestvennym svetom)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 123, Nr 1, pp 60-63 (USSR)

ABSTRACT: The formula by V. L. Levshin and S. I. Vavilov: $P_n = P_p/(2-P_p)$ applies only to isotropic media and to the case in which absorption and emission are dipole-like. P_n and P_p respectively, denote the degree of polarization in the case of excitation by natural and polarized light respectively. The above formula was derived for observations at an angle of $\pi/2$ to the direction of the exciting light. For observations carried out at an angle $\chi \neq \pi/2$ it holds that

$$P_n = P_p(1 - \cos^2 \chi)/(2 - P_p \sin^2 \chi) .$$

However, all considerations in this paper concern the

Card 1/3

special case $\chi = \pi/2$. This paper deals with isotropic solutions for cubic crystals. Calculations are carried out for electric (e) and magnetic (m) dipoles, electric quadrupoles (q), as well as for electric (σ_e) and magnetic (σ_m) circular oscillators. It is known that the dependence of the degree of polarization of isotropic solutions on the angle η between the electric vector of the exciting light and the axis Oz varies for different multipoles. If the degree of polarization remains below 50%, this dependence is described in the special case $\chi = \pi/2$ by the formulae given in a table. The formulae for the various combinations of multipoles differ considerably from one another. In many cases these formulae are suited for the simple determination of the nature of the radiator by means of two measurements. The formula for the connection between the observed values of the degree of polarization of the excitation by natural and by polarized light are of special interest in the case of cubic crystals. For crystals, calculation is analogous to that for isotropic solutions. In this connection, calculations must be carried out for the following three special cases:

The Polarization of Luminescence in the Case of Excitation by Polarized and Natural Light

SOV/20-123-1-15/56

1) The oscillators (of absorption and emission) are orientated parallel to the axes of the fourth order. 2) The oscillators are orientated parallel to the axes of the third order. 3) The oscillators are orientated parallel to the axes of the second order. Sometimes it is necessary to excite polarized luminescence by natural light with a certain admixture of polarized light. A formula is derived for dipole-like emission and absorption for the case in which the degree of polarization of the exciting light is known. There are 2 figures, 4 tables, and 7 references, 6 of which are Soviet.

SUBMITTED: June 9, 1958

Card 3/3

SEVCHENKO, A. N.

24(7),24(0)

AUTHOR: Stepanov, B. I., Academician AS Belorusskaya SSR SOV/30-59-1-9/57

TITLE: Investigations by Belorussian Scientists in the Field of Spectroscopy and Luminescence (Raboty belorusskikh uchenykh po spektroskopii i lyuminestsentsii)

PERIODICAL: Vestnik Akademii nauk SSSR, 1959, Nr 1, pp 68-76 (USSR)

ABSTRACT: These investigations are being carried out at the Institut fiziki i matematiki (Institute of Physics and Mathematics) and the fizicheskiy fakul'tet Belorusskogo universiteta (Physics Department, Belorussian University) under the direction of B. I. Stepanov, A. N. Sevchenko, M. A. Yel'yashevich, Academicians AS BSSR, and F. I. Fedorov, Corresponding Member, Academy of Sciences, BSSR. In the field of theoretical spectroscopy, the investigations by P. A. Apanasevich, B. I. Stepanov ... are mentioned. Further, the following investigations are indicated:

B. I. Stepanov, Ya. S. Khvashchevskaya used the general principles of spectroscopy of negative currents in their examinations.

On the basis of experimental data A. M. Samson obtained important results in the determination of genuine values of optical characteristics of the substance examined.

L. A. Kravtsov, N. P. Ivanov examined calculation methods of reabsorption with large overlapping of absorption and luminescence spectra.

N. A. Borisevich succeeded in obtaining fundamental results in the examination of luminescence of phthalimide vapors. He also showed that the efficiency of quenching collisions may be much less than one.

L. G. Pikulik, under the direction of A. N. Sevchenko, examines the influence of the solvent on the yield of fluorescence as well as the absorption and emission spectra.

Card 2/8

A. N. Sevchenko, G. P. Gurinovich, A. M. Sarzhevskiy examined the luminescence polarization of many combined molecules. At the same time they designed an improved apparatus.

A. N. Sevchenko, V. V. Kuznetsova work in the field of luminescence of rare-earths complexes.

V. A. Pilipovich examined the phenomenon of phosphorescence.

The examinations of optical properties of chlorophyll and related compounds are being carried out in close cooperation with the Institut biologii Akademii nauk BSSR (Institute of Biology, Academy of Sciences, Belorusskaya SSR).

T. N. Godnev, L. A. Kravtsov, R. V. Yefremova examined the absorption and luminescence spectra of a live leaf.

A. N. Sevchenko, G. P. Gurinovich, K. N. Solov'yev, L. A. Kravtsov examined polarization spectra and the dependence of polarization on the wave length of fluorescence.

A. N. Sevchenko, L. V. Volod'ko obtained valuable data of the composition of complex compounds and the nature of intermolecular forces of interaction.

I. P. Shapiro examined the optical and electrical properties of some crystal phosphors.

Card 3/8

A. N. Sevchenko, B. I. Stepanov examined cellulose and its products of transformation.

R. G. Zhbankov, I. N. Yermolenko worked at high pressure in order to study the composition of celluloses by means of spectroscopical methods.

I. N. Yermolenko, R. G. Zhbankov examined the oxidising kinetics of cellulose by means of nitrogen dioxide, iodic acid and chloride.

R. G. Zhbankov, B. I. Stepanov, A. Ya. Rozenberg, A. I. Shrygan, A. M. Shishko examined the mercerizing process of cellulose.

M. M. Pavlyuchenko, I. N. Yermolenko examined the oxidation of celluloses with the use of absorption spectroscopy in the ultraviolet range.

M. M. Pavlyuchenko and collaborators spectrophotometrically examined the adsorption of coloring substances on cellulose.

I. N. Yermolenko, M. Z. Gavrilov examined the luminescence of cellulose products.

B. I. Stepanov, Yu. I. Chekalinskaya determined the dependence of the spectra of dispersed objects on the reduction ratio, the character of the binding agent, and the layer thickness.

Card 4/8

06390
SOV/170-59-2-8/23

24(7)

AUTHORS: Sevchenko, A.N., Volod'ko, L.V.

TITLE: Spectroscopic Investigations of Uranyl Compounds

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, 1959, Nr 2, pp 63-71 (USSR)

ABSTRACT: The authors criticize the viewpoints of previous investigators on the structure of absorption and fluorescence spectra of the uranyl ion UO_2^{++} as contradicting to two experimental findings: the first, by Levshin and Sheremet'yev [Ref 1], that the luminescence spectrum does not depend on the wavelength of excitation light, and the second, by Samoylov [Ref 2], that at a temperature of 4.3°K the spectra of absorption and luminescence overlap very insignificantly. Investigations and conclusions of the other researchers, Stepanov [Ref 1], Vdovenko and Kovaleva [Ref 4], are also cited. The authors obtained crystalline complexes of uranyl nitrate with diethyl ester, acetone, ethyl acetate, nitromethane and ethyl alcohol, and also uranyl acetate with methyl, ethyl and isoamyl alcohols, by the method of preparing crystalline complex uranyl salts from organic solutions. It was established that luminescence spectra of all complex salts distinctly differ from one another and from the spectrum of the initial salt. The comparison of electronic spectra of uranyl compounds shows that their fine

Card 1/3

Spectroscopic Investigations of Uranyl Compounds

of importance for solving some problems of crystallophysics by means of investigating spectroscopic properties of uranyl compounds.
There are: 2 microphotograms, 1 spectrogram, 1 table and 21 references, 10 of which are Soviet, 2 American, 3 German, 2 Dutch, 1 English, 1 French and 2 Indian.

ASSOCIATION: Belorusskiy gosudarstvennyy universitet im. V.I. Lenina (Belorussian State University imeni V.I. Lenin), Minsk.

2.4.3500

66584

SOV/51-7-5-14/21

AUTHORS: Gurinovich, G.P., Sarzhevskiy, A.M. and Sevchenko, A.N.

TITLE: On the Maximum Polarization of Luminescence in Complex Molecules

PERIODICAL: Optika i spektroskopiya, 1959, Vol 7, Nr 5, pp 668-676 (USSR)

ABSTRACT: The theory of polarized fluorescence predicts a maximum value $P_o = 0.5$ for polarization in isotropic solutions. In order to measure the maximum value of polarization it is necessary to eliminate the effect of Brownian rotational motion of molecules. This may be achieved in two ways: either by allowance for rotation of the molecule during the excited-state lifetime or by fixing the molecule (by placing it in a solid). The authors used both these methods to study polarization in the following phthalimide derivatives: 3-monomethylamin ophthalimide, 3-monomethylamino-N-methylphthalimide, 3-aminophthalimide, 3-amino-N-methylphthalimide, 3,6-diamino-N-methylphthalimide. When the first method was employed glycerine was used as a solvent and its viscosity was varied by altering temperature. In the second method polymethyl methacrylate (Perspex) was used as a solvent. Solid solutions were prepared by dissolving phthalimide derivatives in monomethyl methacrylate and polymerizing it in the presence of 1.2% of benzoyl peroxide at 50-70°C. Uniform transparent samples were cut up from Perspex prepared in this way; each sample contained 5×10^{-6} g of a

Card 1/2

On the Maximum Polarization of Luminescence in Complex Molecules

phthalimide derivative in 1 cm^3. The absorption spectra were recorded by means of an SF-4 spectrophotometer and the fluorescence spectra were recorded using a high speed diffraction monochromator. Polarization was measured using a technique described earlier by Gurinovich and Sevchenko (Ref 10); the error in polarization measurements amounted to 3-5%. The measured degrees of polarization along the absorption and fluorescence spectra are shown in Figs 1-3. It was found that when the frequencies of excitation, of fluorescence and of a purely electronic transition were equal, the value of P_o in all compounds approached 0.5 (50%). In all cases the dependence $P_o = f(\nu_{fl})$ was a mirror image of the dependence $P_o = f(\nu_{exc})$, with the frequency of the purely electronic transition as the centre of symmetry. It is shown that the variations in the reported values of P_o and departures of P_o from its theoretical limit are due to vibrations in the ground and excited states of molecules. There are 5 figures, 2 tables and 15 references, 10 of which are Soviet, 2 French, 2 German and 1 Polish.

SUBMITTED: March 21, 1959

4

24(7)

AUTHORS: Kuznetsova, V. V., Sevchenko, A. N. SOV/48-23-1-1/36

TITLE: Luminescence of Organic Complexes of Europium, Samarium, and Terbium (Lyuminestsentsiya organicheskikh kompleksov yevropiya, samariya i terbiya)

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959, Vol 23, Nr 1, pp 2-8 (USSR)

ABSTRACT: The organic complexes of the rare earths possess the agreeable property that the absorption band spectrum belongs to the organic component of the molecule and the luminescence line spectrum is characteristic of the ions of rare earths. These facts were checked. The complexes of rare earths with 5-nitro-salicyl aldehyde, 5-nitro-salicylaldehyde ethylene diamine and ethylene diamine salicyl-aldehyde were investigated. In order to check the band spectrum also the pure organic compounds were investigated. A comparison of the complexes to the pure organic compounds has shown that both almost do not differ. The luminescence of the compounds was investigated in crystalline state and in solution (water, methyl alcohol, ethyl alcohol, amyl acetate, and acetone). The luminescence was excited with light (λ = 365 mμ) at -185°C. The wave

Card 1/3

lengths and the centers of electron transitions are given in the figures of the spectra. In general, it is shown that the line groups characteristic of the inorganic compounds are maintained in the complexes; on the other hand, the number of lines in the groups, their position and energy distribution change considerably during the transition from the inorganic to the organic complexes and from one organic complex to the other. Above all, the number of lines is greater in the individual groups, which is related to the different distribution of levels by the electric field of molecules. The luminescence spectra of the solution differ from crystal spectra as well. In the spectra of the solutions the number of components in the groups is considerably smaller and varies in the individual solvents. The smallest number is to be found in acetone and ether solutions. The solvent exercises influence upon the level distribution. In this manner, the luminescence spectrum of the solutions indicates the surrounding medium. In addition to that, the temperature dependence of the luminescence spectra of some organic complexes and the quantum yield of luminescence were

investigated ($+20^{\circ}$ - -185°). The temperature dependence of luminescence is indicated by the change in brightness of the flare. In the case of inorganic compounds the flare is much weaker and independent of temperature. Measurements of the duration of excitation have shown that it depends on the respective organic compound. According to these data the authors arrived at the conclusion that in organic complexes the ions of rare earths receive the excitation energy from the organic component of the molecule and extinction is caused by deactivation in the organic component of the molecule. There are 5 figures, 1 table, and 9 references, 7 of which are Soviet. (This article and the following 34 articles of this issue were read at the VI Conference on Luminescence, held in Leningrad, 17-23 February 1958.)

66852

5.4120
~~5(4)~~

SOV/76-33-11-5/47

AUTHORS: Sarzhevskiy, A. M., Sevchenko, A. N.

TITLE: Luminescence Method for the Determination of the Volumes of the Solvate Envelopes of Molecules in Solutions

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 11, pp 2410-2413 (USSR)

ABSTRACT: The method mentioned in the title which is based on a study of the anisotropy of the photo luminescence of solutions is recommended. When a plane-polarized light beam passes through a solution, also plane-polarized radiation is induced by the anisotropy of the luminescent molecule of the system. The polarization of the photoluminescence is caused by the fact that the dissolved molecules have fixed axes along which there are primarily elementary oscillators present. The degree of polarization depends on the absorbing and emitting oscillators and, most of all, on the viscosity of the medium. Moreover it increases with rising viscosity. According to the theory of Smolukhovskiy and Einstein, a molecule of the volume V in a liquid of the viscosity η will turn within a short time Δt through the angle $\Delta\varphi$. When replacing Δt by the value τ of the

Card 1/2

Luminescence Method for the Determination of the Volumes of the Solvate Envelopes of Molecules in Solutions

mean duration of excited luminescence an equation is obtained for the degree of polarization in dependence on viscosity, temperature, the molecule volume, and on other molecule parameters. This equation (2) was first proposed by V. L. Levshin (Ref 4) and later by F. Perrin (Perren). As the value τ can be accurately measured with a fluorometer (Ref 5), equation (2) offers a new method for experimental determination of the volume of the solvate envelope. The method was tested in investigating fluorescein, rhodamine B, and chlorophyll. The values agreed with those of Marinesco (Ref 1) obtained by the diffusion method. In addition, phthalimide derivatives synthesized by V. V. Zelinskiy were investigated by the new method in various solvents and their mixtures (Tables 1,2). There are 2 tables and 7 references, 6 of which are Soviet.

ASSOCIATION: Akademiya nauk BSSR, Institut fiziki, Minsk (Academy of Sciences of the BSSR, Institute of Physics, Minsk)

24 (7)
AUTHORS: Sevchenko, A. N., Academician, AS BSSR, SOV/20-126-5-18/69
Gurinovich, G. P., Sarzhevskiy, A. M.

TITLE: On the Limit Polarization of Fluorescence (O predel'noy polyarizatsii fluorestsentsii)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 126, Nr 5, pp 979 - 982 (USSR)

ABSTRACT: The authors first discuss the fact that the limit values of the degree of fluorescence polarization P_o do not attain the theoretical value $P_o=0.5$ if all known depolarizing factors are eliminated. Further, the authors deal with a number of articles published by other authors on this field. In order to obtain the limit values of the degree of fluorescence polarization, it is necessary to eliminate Brown's rotational motion; for this purpose, solid solutions of phthalimides in polymethyl methacrylate of the concentration 5.10^{-6} g/cm^3 are used. The frequency dependence of the degree of emission- and absorption spectrum polarization is shown by figures 1 and 2; table 1 contains corresponding results for various compounds. Measurement of the

Card 1/3

polarization degree of fluorescence with the frequency $\nu_{em} = \nu_{el}$ and excitation in various ranges of the long-wave absorption bands yielded straight line 1, in the excitation by light with the frequency $\nu_{exc} = \nu_{el}$, straight line 2 resulted, $P_o(\nu_{exc})$ (straight line 3) was obtained from the observation of the fluorescence with $\nu_2 < \nu_{el}$, $P_o(\nu_{em})$ (straight line 4) in the case of excitation with $\nu_1 > \nu_{el}$, and straight line 5 when $\nu_3 < \nu_{el}$ (all data given in Fig 1). Figure 2 shows the frequency dependence of the degree of emission- and absorption spectrum polarization in the case of excitation in two absorption bands which have opposite signs of fluorescence polarization. The absolute values of the degree of polarization increase both for positive and negative signs with approaching frequency of the pure electron transitions. In most cases the curves $P_o = f(\nu_{exc})$ and $P_o = g(\nu_{em})$ are mirror-symmetric. The absolute values of P_o in the case of excitation by light of the frequency $\nu_{exc} = \nu_{el}$ in solid solutions attain almost the theoretical limit when the fluores-

cence of the same frequency is observed. The authors discuss in detail the fact that it attains a maximum value of 0.48 instead of 0.50 and consider possible reasons for this observation. A scheme illustrating the quantum transitions (Fig 3) is discussed as well in connection with the curves plotted in figures 1 and 2. The dependence of the polarization degree on the frequency of the exciting light within the long-wave band in the case of absorption and emission is explained by the different orientation of the dipole moments of the direct and reverse transitions (Scheme by Jablonski, Ref 7). There are 3 figures, 1 table, and 7 references, 5 of which are Soviet.

ASSOCIATION: Institut fiziki i matematiki Akademii nauk BSSR (Institute of Physics and Mathematics of the Academy of Sciences, BelorussianSSR)

SUBMITTED: March 9, 1959

24(7) SOV/20-127-6-13/51

AUTHORS: Sevchenko, A. N., Academician, AS BSSR, Gurinovich, G. P., Sarzhevskiy, A. M.

TITLE: On the Polarization of the Fluorescence of Complicated Molecules With Spectra Which Cannot Be Classified by the Rule of Mirror Symmetry

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 6, pp 1191-1194 (USSR)

ABSTRACT: V. L. Levshin showed in a paper (Ref 1) that some complicated molecules have a mirror-symmetric spectrum, and the complicated molecules are accordingly classified in molecules of first and second type. Besides, B. S. Neporent suggested a scheme with four levels for the molecules of second type. In connection with the mirror-symmetric dependence of polarization on the frequency in the molecules of first type, it would be much interesting to study this dependence for molecules of the second type in order to determine electron transitions in this way. Solid solutions of compounds with molecules of the second type were investigated for the dependence of

Card 1/4

On the Polarization of the Fluorescence of Complicated Molecules With Spectra Which Cannot Be Classified by the Rule of Mirror Symmetry

polarization of the fluorescence on the frequency of the exciting light. The experimental methods have already been described in another paper (Ref 8), and the measurement results are shown in four diagrams (Fig 1). The spectra of the absorption, of the fluorescence, and the dependence of the degree of polarization on the observation conditions and the excitation frequency are represented graphically. It is ascertained that the spectra change considerably in the transition to the solid solution. This change consists in an increase in the half widths. To investigate this more closely, polarization measurements were carried out on glycerin solutions, which showed that there is no considerable change of the polarization characteristic in the transition to solutions, but the half widths of the fluorescence bands greatly depend on the half widths of the absorption bands. Besides, the dependence of polarization on individual

On the Polarization of the Fluorescence of Complicated Molecules With Spectra Which Cannot Be Classified by the Rule of Mirror Symmetry

exciting frequencies was investigated. From the results obtained, conclusions are made concerning the inner molecule vibrations, and it is ascertained that between the directions of the dipole moments of the emission- and absorption transitions there is an angle depolarizing the fluorescence. The level scheme shown in figure 2 with the corresponding transitions is then discussed in detail, and finally it is ascertained that the scheme with four levels suggested by B. S. Neporent is not sufficient. The authors thank B. I. Stepanov for his interest in the work and the valuable discussions. There are 2 figures and 12 Soviet references.

ASSOCIATION: Institut fiziki Akademii nauk BSSR
(Institute of Physics of the Academy of Sciences, Belorussian SSR)

24(7) SOV/2o-128-3-21/58

AUTHORS: Sevchenko, A. N., Academician of the AS of the Belorussian SSR, Gurinovich, G. P., Solov'yev, K. N.

TITLE: On the Symmetry of Porphyrin Molecules

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 3, pp 510-513 (USSR)

ABSTRACT: The problem of the symmetry of porphyrin molecules under various conditions has not yet been solved and was dealt with by several authors in a different manner. An experimental investigation of these symmetry properties would therefore be of some interest. The authors investigated the polarization of porphyrin fluorescence in acid and neutral medium as well as of metallic porphyrins. In the above solvents the absorption spectra of the substances under discussion exhibit a shape that is typical of porphyrins, and differ from spectra in other solvents only by a slight band shift. In all cases, these spectra appeared to possess two bands which are approximately symmetrical to the two absorption bands. Fluorescence was excited in the longwave absorption band, and the degree of polarization was measured in the shortwave emission band. For a determination of the limiting polarization, the authors in-

Card 1/3

vestigated the dependence of the degree of polarization on the solution viscosity (varying within rather wide limits). The authors did not dispose of an unsubstituted porphin, whose molecule has the greatest symmetry. The molecule of tetraphenyl porphin under investigation exhibits the same symmetry properties as the porphine molecule, and the conclusions drawn on the symmetry of this molecule apply to porphin molecules as well. Tetraphenyl porphin unfortunately does not fluoresce in acid medium; this is why this compound and its cyclic complex can be investigated in neutral medium only. The degree of polarization of Zn tetraphenyl porphin (13%) does not exceed the theoretical value if the symmetry is beyond the third order (14.3%). In neutral medium, symmetry is not beyond the second order. With mesoporphyrin and protoporphyrin in acid medium, limiting polarization is very low, but somewhat higher than 1/7. This is why the four central protons are found in the molecule plane. The conjugated system of bonds is illustrated in three diagrams. The limiting polarization of Zn-mesoporphin equally exceeds 1/7. Also with Zn-mesoporphyrin, the deviations from the theoretical value are probably due to the effect of the lateral substituent. The authors thank M. G. Gurevich for valuable discussions and for providing the compounds under discussion. There are 5 figures, 1 table, and 14 references,

On the Symmetry of Porphyrin Molecules SOV/2o-128-3-21/58

7 of which are Soviet.

ASSOCIATION: Institut fiziki Akademii nauk BSSR
(Physics Institute of the Academy of Sciences of the Belorussian SSR)

SUBMITTED: June 24, 1959

Card 3/3

5.3200, 5.2600(A)

66424

~~5 (3)~~

AUTHORS: Ol'dekop, Yu. A., Sevchenko, A. N., Academician AS BSSR, Zyat'kov, I. P., Bylina, G. S., Yel'nitskiy, A. P.

SOV/20-128-6-29/63

TITLE: A New Method of Synthesizing Asymmetric Acyl Peroxides

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 6, pp 1201 - 1203 (USSR)

ABSTRACT: After giving a survey of the production methods of symmetric and asymmetric acyl peroxides ($RCOOOCOR$, and $RCOOOCOR'$, respectively) (Refs 1-5, as well as F. Jurečka and R. Chromeček, Ref 6), the authors put forward some details of the method mentioned in the title. When a mixture of aromatic aldehyde and acetic anhydride (1 : 3) is oxidized in the air, the asymmetric acyl peroxides are formed (see Diagram in which X = p-CH_3, p-CH_3O, p-Cl; m-Cl). After 3-6 hours, the yields were 53-88%. The oxidation proceeded at 30-40° in the presence of anhydrous sodium acetate (0.2-0.3% of all substances) or calcium carbonate (10-15%). The air-charging rate was 2.5-3 l/min. The reaction mixture was illuminated with a 75 w electric bulb. All peroxides obtained are well soluble in benzene, ether, CCl_4, chloroform, alcohol, petroleum ether, and acetic acid. They explode in an open flame. They are

Card 1/2

A New Method of Synthesizing Asymmetric Acyl Peroxides

66424
SOV/20-128-6-29/63

peroxides of acetyl-p-chloro-benzoyl (I), acetyl-p-methyl-benzoyl (II), acetyl-m-chloro-benzoyl (III), and acetyl-p-methoxy-benzoyl (IV). Figure 1 shows their infrared spectra. The positions of the maxima of the 3 bands agree in (I) and (II), while they are shifted toward higher frequencies in (III), and in the direction of lower frequencies in (IV). Evidently, these bands are due to the oscillations of a benzene ring having a substituent. The results of a further analysis of the said spectra agree with the data of reference 9. Figure 2 shows ultraviolet spectra of 0.01 m.-solutions in CCl_4 of the substances produced in the range of 233-305 mμ. The analysis of these spectra is continued in a further paper by the authors. Finally, acetyl-2,4-dimethyl-benzoyl peroxide was produced, and the oxidation of benzaldehyde in propionic anhydride was studied. Investigations of other aldehydes and acid anhydrides in this reaction are being carried on. There are 2 figures and 9 references, 1 of which is Soviet.

ASSOCIATION: Belorusskiy gosudarstvennyy universitet im. V. I. Lenina (Belorussiya State University imeni V. I. Lenin)

SUBMITTED: July 6, 1959

Card 2/2

4

S/081/62/000/003/005/090
B151/B144

AUTHORS: Ol'dekop, Yu. A., Sevchenko, A. N., Zyat'kov, I. P., Bylina, G. S., Yel'nitskiy, A. P.

TITLE: Unsymmetrical diacyl peroxides

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 3, 1962, 17, abstract 3B91 (Sb. nauchn. rabot. In-t fiz.-organ. khimii AN BSSR, no. 8, 1960, 13 - 18)

TEXT: Peroxides of acetyl-n-chlorobenzoyl (I), acetyl-n-methyl-benzoyl (II), acetyl-m-chlorobenzoyl (III), acetyl n-methoxy benzoyl (IV), acetyl-o-methyl-benzoyl (V), acetyl 2,4-dimethyl-benzoyl (VI), and propionyl-benzoyl (VII) are obtained. A mixture of an aromatic aldehyde and an acid anhyaride (1 : 3) is oxidized at 30 - 40° in the presence of anhydrous Na acetate (0.2 - 0.3% by weight of the sampled substances) or of Ca carbonate (10 - 15%) with air admitted at a rate of 2.5 - 3 liters/min. The reaction is carried out in diffuse daylight or in illumination from an incandescent lamp of 50 - 75 w for 3 - 6 hr. The product obtained is decanted with water or treated (in special cases) with HNO_3. The peroxide separating out

Card 1/2

Unsymmetrical diacyl peroxides

is washed with water, a solution of $NaHCO_3$, and then again with water and dried. I, m.p. 49.5°C; II, m.p. 65 - 65.6°C; III, m.p. 53 - 54°C; IV, m.p. 59.5°C; V, solidification temperature -20°C, d_4^{20} 1.1620; $n^{20}D$ 1.5126; VI, solidification temperature -7 to -9°C, d_4^{20} 1.1370; $n^{20}D$ 1.5216; VII, solidification temperature -2°C, d_4^{20} 1.1530; $n^{20}D$ 1.5097. IR and UV absorption spectra of V-VII are obtained. The spectra of substances I - IV were obtained previously (RZhKhim, 1960, no. 10, 38647). In the region of 1750 - 1640 cm^{-1} of the IR spectra, two bands are found belonging to the stretching vibrations of the C = O group. An interpretation is given for several other bands found in the spectra of I - IV. In the UV absorption spectra of V and VII, an intense absorption band is observed with maxima at 239 and 235 mμ. VII also absorbs at 275 and 283 mμ. In the spectrum of V, these bands are only very weakly developed. In the region above 300 mμ all the substances studied were transparent. [Abstracter's note: Complete translation.]

Card 2/2

S/048/60/024/006/020/030/XX
B013/B067

AUTHORS: Pikulik, L. G. and Sevchenko, A. N.

TITLE: Temperature Dependences of the Fluorescence Quantum Yield of Some Phthalimides in Various Solvents

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960, Vol. 24, No. 6, pp. 729-733

TEXT: The authors studied the temperature dependences of the fluorescence yields of some phthalimides in high-boiling solvents. The student L. Volod'ko took part in the measurements. These solvents showed a considerable shift of the spectral lines when temperature was increased. The studies were made on a photoelectric apparatus in which an YM-2 (UM-2) monochromator was used. A spectrophotometer of the type CΦ-4 (SF-4) was used to study the absorptiveness of the solutions. Fig. 2 shows fluorescence spectra of 4-dimethylamino-N-methylphthalimide in various media at different temperatures. In benzyl alcohol and cyclohexanol solutions, the quantum yield is increased by an increase of temperature, whereas in dimethylphthalate solutions it is reduced. Fig. 3a shows the temperature

$B_{quant} = f(\nu^{fl}_{max})$ (Fig. 1). In the former, an increase in the yield is little probable. Fig. 3b shows the temperature dependence of the quantum yield of 3-aminophthalimide. In benzyl alcohol, glycol, and cyclohexanol solutions, the peaks of the fluorescence spectrum are at 20°C in the region of $20,000 \div 20,400$ cm^{-1}. The yield is relatively constant with rising temperature. With 3-aminophthalimide solutions in dimethylphthalate and pinene, the extinction of fluorescence at $\nu^{fl}_{max} = 21,100$ cm^{-1} and $\nu^{fl}_{max} = 22,000$ cm^{-1}, respectively, is strongly marked. The duration of the excited state was measured at room temperature and above. The results are tabulated and compared with the quantum yield obtained under similar conditions. It may be seen that the relative change in the yield causes a corresponding change in the duration of the excited state. With an accuracy up to the difference of the values B/B_o and τ/τ_o, the processes of extinction and excitation of fluorescence observed are not due to a change of the inactive absorption. This again confirms the relationship between

Temperature Dependences of the Fluorescence Quantum Yield of Some Phthalimides in Various Solvents

S/048/60/024/006/020/030/XX
B013/B067

the yield and the spectrum of fluorescence. The authors thank V. V. Zelinskiy for valuable comments, and A. M. Bonch-Bruyevich and G. A. Tishchenko for making the fluorometric measurements possible. The present paper was read at the Eighth Conference on Luminescence (Molecular Luminescence and Luminescence Analysis) which took place in Minsk from October 19 to 24, 1959. There are 3 figures, 1 table, and 8 Soviet references.

ASSOCIATION: Institut fiziki Akademii nauk BSSR (Institute of Physics of the Academy of Sciences BSSR)

Card 4/4

85232

S/048/60/024/006/025/030/XX
B013/B067

24.3500

AUTHORS: Volod'ko, L. V., Sevchenko, A. N., and Umreyko, D. S.

TITLE: The Agreement Between the Absorption and Luminescence Spectra of the Solutions of Uranyl Compounds

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960, Vol. 24, No. 6, pp. 749-751

TEXT: At room temperature, the luminescence and absorption spectra of uranyl solutions show no mirror symmetry although V. L. Levshin (Ref. 1) observed the presence of a certain mirror symmetry in 1937. The observance of the conditions necessary for producing absorption and emission spectra with mirror symmetry offers the possibility of explaining the degree of deviation of the spectra of uranyl solutions from mirror symmetry and the reasons of this deviation . Absorption and luminescence spectra of 0.1 M uranyl sulfate solution at room temperature were calculated. The frequency of the pure electron transition was determined by comparing the luminescence spectra of the above-mentioned solution with the spectrum of crystalline uranyl sulfate at -185°C and -269°C. The frequency of pure electron

Card 1/3

The Agreement Between the Absorption and Luminescence Spectra of the Solutions of Uranyl Compounds

S/048/60/024/006/025/030/XX
B013/B067

transition in the solution is shifted by 50 cm^{-1} toward short waves, and amounts to about 20,380 cm^{-1}. The frequency of perfectly symmetrical stretching vibrations of the uranyl ion amounts to ~700 cm^{-1} in the excited electron state and to ~850 cm^{-1} in the non-excited state. Fig. 1 shows that the absorption spectrum of an aqueous uranyl sulfate solution is much more complex than the calculated absorption spectrum which is quasisymmetrical with respect to the spectrum of fluorescence. The disagreement between the experimental and the calculated absorption spectrum may be caused by the presence of several excited electron states. On the basis of studies of the Zeeman effect and of the measurements of polarization of spectral lines of a large number of crystalline uranyl salts, Dieke and Duncan (Ref. 6) divided the lines which they had studied into four series. The different behavior of these lines in a magnetic field and their different polarization prove that these groups of lines are caused by the transitions of the uranyl ion into different electron states (Fig. 2). By applying mirror symmetry, one of the electron states mentioned by Dieke and Duncan could be observed in uranyl compounds, i.e., the

S/020/60/133/003/026/031/XX
B019/B067

AUTHORS: Sevchenko, A. N., Academician of the AS BSSR, Gurinovich, G. P., and Solov'yev, K. N.

TITLE: Some Characteristics of the Polarization of Fluorescence of Porphyrines

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 133, No. 3, pp. 564 - 567

TEXT: The authors attempted to study the relationship between the degree of polarization of emitted waves and their wavelength, and also the spatial orientation of the absorption oscillators. For this purpose they took the polarization spectra of two fluorescence bands of pheophytin (A) of dimethyl ether of protoporphyrine IX (B) and of α-, β-, γ-, and δ-tetraphenylporphyrines (C). The measurements were made with a device having two monochromators, castor oil and glycerin being used as solvents. The results of measurement for (B), dissolved in castor oil, and the results for (A) are graphically represented in Fig. 1 and Fig. 2, respectively. The results for (C) are analogous to those of (B). In these diagrams,

Card 1/2

Some Characteristics of the Polarization of Fluorescence of Porphyrines

S/020/60/133/003/026/031/XX
B019/B067

curve 1 represents the absorption spectrum, curve 2 the luminescence spectrum, curve 3 the degree of polarization as a function of wavelength, and curves 4 and 5 the polarization spectra of the first two luminescence bands. These results are discussed on the basis of the ordinary theory of polarized luminescence, and it is stated that the results may be satisfactorily explained only for highly hypothetical additional conditions. The authors mention another interpretation of the results for which they assume that the superposition of not perfectly symmetric oscillations causes a great change in the oscillator properties. It is usually assumed that in the electron spectra of polyatomic molecules mainly symmetric vibrations occur; in this case the oscillator maintains its direction. This assumption is related to the neglect of the dependence of the matrix elements of the dipole transition moment on the nuclear coordinates. The authors demonstrate that unsymmetrical vibrations may occur by taking account of this dependence. They thank M. G. Gurevich for having synthetized the compounds investigated, and M. A. Yel'yashevich and B. I. Stepanov, Academicians of the AS BSSR, for a discussion. There are 2 figures and 8 references: 5 Soviet, 2 US, and 1 German.

Card ~~2/4~~ 2/2

Inst. Physics AS BSSR

VOLOD'KO, L.V.; SEVCHENKO, A.N., akad.; UMRYKO, D.S.

Interpretation of electronic and vibrational absorption spectra of uranyl nitrates. Dokl. AN SSSR 135 no.3:560-563 N '60. (MIRA 13:12)

1. Belorusskiy gosudarstvennyy universitet im.V.I.Lenina. 2.Akademiya nauk BSSR (for Sevchenko).
(Uranyl nitrate—Spectra)

GURINOVICH, G.P.; SEVCHENKO, A.N.; SOLOV'YEV, K.N.

Maximum polarization of the fluorescence of porphyrins.
Opt. i spektr. 10 no.6:750-758 Je '61. (MIRA 14:8)
(Polarization (Light)) (Fluorescence)
(Porphyrins--Spectra)

OL'DEKOP, Yu.A.; SEVCHENKO, A.N.; ZYAT'KOV, I.P.; BYLINA, G.S.; YEL'NITSKIY, A.P.

Diacyl peroxides. Part 1: Synthesis and properties of nonsymmetric diacyl peroxides. Zhur.ob.khim. 31 no.9:2904-2910 S '61. (MIRA 14:9)

1. Belorusskiy gosudarstvennyy universitet imeni V.I.Lenina.
(Peroxides)